MENTAL
ARITHMETIC

WENTWORTH

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BY

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BOSTON, U.S.A.
PUBLISHED BY GINN & COMPANY
1895

MENTAL ARITHMETIC.

CHAPTER I.

INTEGRAL NUMBERS.

Lesson 1.

1. Mary has 2 cents, and her mother gives her 1 more; how many cents has Mary then ?

2. Charles had 2 marbles, and found 2 more in the schoolyard; how many marbles had he then ?

3. Lucy found 3 eggs in a box and 3 more in the hay; how many eggs did she find in all ?

4. John gave 3 pond-lilies to Hattie, and Arthur gave her 4; how many had she in all ?

5. A boy has 5 rabbits in one pen and 2 in another ; how many rabbits has he in both pens ?

6. Mr. Brown had 4 horses, and bought 3 more; how many horses had he then ?

7. Agnes has 4 spools of black thread and 5 spools of white; how many spools has she of both kinds ?

8. James earned 6 dollars and afterwards 4 dollars more; how many dollars did he earn ?

9. Mrs. Adams paid her grocer 5 dollars for sugar and 3 dollars for flour ; how many dollars did she pay ?

1. Charles spent 7 cents for oranges and 3 cents for apples ; how many cents did he spend in all ?

2. Anna has 6 red roses and 2 white roses ; how many roses has she ?

3. If there are 3 birds on one tree and 4 on another, how many birds are there on both trees ?

4. A boy gets 2 stamps from his sister and 5 from his mother ; how many stamps has he then ?

5. If a man has 4 bay horses and 6 white horses, how many horses has he ?

6. I can see 5 dogs in the street and 3 in the yard ; how many dogs can I see ?

7. If one boy makes 3 snow-men and another makes 6, how many snow-men do both boys make ?

8. There are 2 boys and 7 girls in the front row ; how many children are there in the front row ?

9. I have 4 books on my table and 4 on the shelf ; how many books have I ?

10. A farmer has 3 cords of wood in one pile and 6 cords in another ; how many cords has he ?

11. If 6 inches of snow fall in the forenoon and 4 in the afternoon, how many inches fall in the day ?

12. If a school has 2 men and 8 women for teachers, how many teachers are there in the school ?

13. There were 3 boys in the class, and 6 more entered ; how many boys were there then ?

14. One of my book-cases has 4 shelves and another has 5 ; how many shelves have both ?

15. A boy spent 5 cents for an orange and 5 cents ⊤ three apples ; how many cents did he spend ?

Lesson 3.

ADDITION TABLE.

1	1	1	1	1	1	1	1	1	1
0	1	2	3	4	5	6	7	8	9
2	2	2	2	2	2	2	2	2	2
0	1	2	3	4	5	6	7	8	9
3	3	3	3	3	3	3	3	3	3
0	1	2	3	4	5	6	7	8	9
4	4	4	4	4	4	4	4	4	4
0	1	2	3	4	5	6	7	8	9
5	5	5	5	5	5	5	5	5	5
0	1	2	3	4	5	6	7	8	9
6	6	6	6	6	6	6	6	6	6
0	1	2	3	4	5	6	7	8	9
7	7	7	7	7	7	7	7	7	7
0	1	2	3	4	5	6	7	8	9
8	8	8	8	8	8	8	8	8	8
0	1	2	3	4	5	6	7	8	9
9	9	9	9	9	9	9	9	9	9
0	1	2	3	4	5	6	7	8	9

NOTE. The Teacher should copy this Addition Table on the board, and require *each pupil in turn* to name the sums as the pointer touches the examples at random. The drill should be continued daily until every pupil is absolutely certain of the required answer.

Lesson 4.

1. Maude picked 3 white roses and 8 red ones; how many roses did she pick?

2. Henry spent 7 cents for oranges and 5 cents for apples; how many cents did he spend?

3. I have 4 pears in one basket and 9 in another; how many pears have I?

4. If I pay my grocer 9 dollars for flour and 3 dollars for sugar, how many dollars do I pay him?

5. A man has 8 dollars in bills and 5 dollars in silver; how many dollars has he?

6. How many trees are there in an orchard which has 9 apple trees and 6 pear trees?

7. There are 7 desks in one row and 6 in another; how many desks are there in both rows?

8. A peddler sells 8 knives at one house and 7 at another; how many knives does he sell?

9. A man pays 9 dollars for boots and 4 dollars for a hat; how many dollars does he pay for both?

10. A girl pays 10 cents for worsted and 8 cents for thread; how many cents does she pay for both?

11. A farmer has 3 cows in the stable and 16 in the yard; how many cows has he in all?

12. In a livery stable there are 12 black horses and 5 white horses; how many are there in the stable?

13. Henry found 6 eggs in one nest and 13 in another; how many eggs did he find in both nests?

14. One child has 11 cents and another has 7; how many cents have both children?

15. John is 9 years old and Mary is 8 years older; how old is Mary?

Lesson 5.

1. A boy saw 7 crows on the ground and 9 flying about; how many crows did he see ?

2. One hen has 9 chickens and another has 8; how many chickens have both hens ?

3. John paid 7 cents for his block of paper and William paid 13 cents for his; how many cents did both blocks cost ?

4. If I pay 12 cents for postage on one bundle and 8 cents on another, how many cents do I pay ?

5. Lucy bought 11 yards of white ribbon and 6 yards of red; how many yards did she buy ?

6. Mary is 9 years old and her brother is **10**; what is the sum of their ages ?

7. The cook used 6 eggs for a pudding and 9 for cake; how many eggs did she use in all ?

8. A farmer sold 9 bushels of potatoes to one man and 9 to another; how many bushels did he sell ?

9. If there are 7 apples in one dish and 9 in another, how many apples are there in both dishes ?

10. I paid 7 dollars for a ton of coal and 6 dollars for a cord of wood; how many dollars did I pay ?

11. A boy has 8 cents and earns 8 cents more; how many cents has he then ?

12. I walked 6 miles and rode 14 miles; how many miles did I go ?

13. If I pay 12 cents for paper and 6 cents for pencils, how many cents do I spend ?

14. A farmer has 8 Jersey cows and 7 Durham cows; how many cows has he in all ?

15. How many eggs are 8 eggs and 9 eggs ?

Lesson 6.

1. A farmer sold 8 sheep and 6 lambs; how many sheep and lambs did he sell?

2. My father paid 12 dollars for a coat and 5 dollars for boots; how many dollars did he pay for both?

3. If in one class there are 7 scholars and in another 9, how many are there in both classes?

4. One roll of ribbon contains 8 yards and another 9; how many yards do both rolls contain?

5. George caught 6 trout and John caught 12; how many did both boys catch?

6. A boy picked 8 quarts of berries in the forenoon and 7 quarts in the afternoon; how many quarts did he pick in the day?

7. A girl bought a quire of paper for 12 cents and a bunch of envelopes for 7; how many cents did she pay for paper and envelopes?

8. One shelf has 7 books and another has 11; how many books are there on both shelves?

9. One string is 9 inches long, another is 5 inches long; how many inches are there in both strings?

10. If I put 7 eggs with 9 eggs, how many eggs shall I have?

11. Florence had 6 white roses and 8 red roses; how many roses had she in all?

12. Charles paid 5 cents for car fare and 14 cents for peaches; how many cents did he spend?

13. One girl hemmed 7 handkerchiefs and another hemmed 6; how many did both girls hem?

14. One piece of cloth contains 8 yards and another contains 7 yards; how many yards in both pieces?

Lesson 7.

1. How many are 1 and 6 ? 11 and 6 ? 21 and 6 ? 31 and 6 ? 41 and 6 ? 51 and 6 ? 61 and 6 ? 71 and 6 ? 81 and 6 ? 91 and 6 ?

2. How many are 2 and 6 ? 12 and 6 ? 22 and 6 ? 32 and 6 ? 42 and 6 ? 52 and 6 ? 62 and 6 ? 72 and 6 ? 82 and 6 ? 92 and 6 ?

3. How many are 3 and 6 ? 13 and 6 ? 23 and 6 ? 33 and 6 ? 43 and 6 ? 53 and 6 ? 63 and 6 ? 73 and 6 ? 83 and 6 ? 93 and 6 ?

4. How many are 4 and 6 ? 14 and 6 ? 24 and 6 ? 34 and 6 ? 44 and 6 ? 54 and 6 ? 64 and 6 ? 74 and 6 ? 84 and 6 ? 94 and 6 ?

5. How many are 5 and 6 ? 15 and 6 ? 25 and 6 ? 35 and 6 ? 45 and 6 ? 55 and 6 ? 65 and 6 ? 75 and 6 ? 85 and 6 ? 95 and 6 ?

6. How many are 6 and 6 ? 16 and 6 ? 26 and 6 ? 36 and 6 ? 46 and 6 ? 56 and 6 ? 66 and 6 ? 76 and 6 ? 86 and 6 ? 96 and 6 ?

7. How many are 7 and 6 ? 17 and 6 ? 27 and 6 ? 37 and 6 ? 47 and 6 ? 57 and 6 ? 67 and 6 ? 77 and 6 ? 87 and 6 ? 97 and 6 ?

8. How many are 8 and 6 ? 18 and 6 ? 28 and 6 ? 38 and 6 ? 48 and 6 ? 58 and 6 ? 68 and 6 ? 78 and 6 ? 88 and 6 ? 98 and 6 ?

9. How many are 9 and 6 ? 19 and 6 ? 29 and 6 ? 39 and 6 ? 49 and 6 ? 59 and 6 ? 69 and 6 ? 79 and 6 ? 89 and 6 ? 99 and 6 ?

10. How many are 10 and 6 ? 20 and 6 ? 30 and 6 ? 40 and 6 ? 50 and 6 ? 60 and 6 ? 70 and 6 ? 80 and 6 ? 90 and 6 ?

Lesson 8.

1. How many are 1 and 7 ? 11 and 7 ? 21 and 7 ?
31 and 7 ? 41 and 7 ? 51 and 7 ? 61 and 7 ? 71
and 7 ? 81 and 7 ? 91 and 7 ?

2. How many are 2 and 7 ? 12 and 7 ? 22 and 7 ?
32 and 7 ? 42 and 7 ? 52 and 7 ? 62 and 7 ? 72
and 7 ? 82 and 7 ? 92 and 7 ?

3. How many are 3 and 7 ? 13 and 7 ? 23 and 7 ?
33 and 7 ? 43 and 7 ? 53 and 7 ? 63 and 7 ? 73
and 7 ? 83 and 7 ? 93 and 7 ?

4. How many are 4 and 7 ? 14 and 7 ? 24 and 7 ?
34 and 7 ? 44 and 7 ? 54 and 7 ? 64 and 7 ? 74
and 7 ? 84 and 7 ? 94 and 7 ?

5. How many are 5 and 7 ? 15 and 7 ? 25 and 7 ?
35 and 7 ? 45 and 7 ? 55 and 7 ? 65 and 7 ? 75
and 7 ? 85 and 7 ? 95 and 7 ?

6. How many are 6 and 7 ? 16 and 7 ? 26 and 7 ?
36 and 7 ? 46 and 7 ? 56 and 7 ? 66 and 7 ? 76
and 7 ? 86 and 7 ? 96 and 7 ?

7. How many are 7 and 7 ? 17 and 7 ? 27 and 7 ?
37 and 7 ? 47 and 7 ? 57 and 7 ? 67 and 7 ? 77
and 7 ? 87 and 7 ? 97 and 7 ?

8. How many are 8 and 7 ? 18 and 7 ? 28 and 7 ?
38 and 7 ? 48 and 7 ? 58 and 7 ? 68 and 7 ? 78
and 7 ? 88 and 7 ? 98 and 7 ?

9. How many are 9 and 7 ? 19 and 7 ? 29 and 7 ?
39 and 7 ? 49 and 7 ? 59 and 7 ? 69 and 7 ? 79
and 7 ? 89 and 7 ? 99 and 7 ?

10. How many are 10 and 7 ? 20 and 7 ? 30 and
7 ? 40 and 7 ? 50 and 7 ? 60 and 7 ? 70 and 7 ?
80 and 7 ? 90 and 7 ?

Lesson 9.

1. How many are 1 and 8? 11 and 8? 21 and 8? 31 and 8? 41 and 8? 51 and 8? 61 and 8? 71 and 8? 81 and 8? 91 and 8?

2. How many are 2 and 8? 12 and 8? 22 and 8? 32 and 8? 42 and 8? 52 and 8? 62 and 8? 72 and 8? 82 and 8? 92 and 8?

3. How many are 3 and 8? 13 and 8? 23 and 8? 33 and 8? 43 and 8? 53 and 8? 63 and 8? 73 and 8? 83 and 8? 93 and 8?

4. How many are 4 and 8? 14 and 8? 24 and 8? 34 and 8? 44 and 8? 54 and 8? 64 and 8? 74 and 8? 84 and 8? 94 and 8?

5. How many are 5 and 8? 15 and 8? 25 and 8? 35 and 8? 45 and 8? 55 and 8? 65 and 8? 75 and 8? 85 and 8? 95 and 8?

6. How many are 6 and 8? 16 and 8? 26 and 8? 36 and 8? 46 and 8? 56 and 8? 66 and 8? 76 and 8? 86 and 8? 96 and 8?

7. How many are 7 and 8? 17 and 8? 27 and 8? 37 and 8? 47 and 8? 57 and 8? 67 and 8? 77 and 8? 87 and 8? 97 and 8?

8. How many are 8 and 8? 18 and 8? 28 and 8? 38 and 8? 48 and 8? 58 and 8? 68 and 8? 78 and 8? 88 and 8? 98 and 8?

9. How many are 9 and 8? 19 and 8? 29 and 8? 39 and 8? 49 and 8? 59 and 8? 69 and 8? 79 and 8? 89 and 8? 99 and 8?

10. How many are 10 and 8? 20 and 8? 30 and 8? 40 and 8? 50 and 8? 60 and 8? 70 and 8? 80 and 8? 90 and 8?

Lesson 10.

1. How many are 1 and 9? 11 and 9? 21 and 9? 31 and 9? 41 and 9? 51 and 9? 61 and 9? 71 and 9? 81 and 9? 91 and 9?

2. How many are 2 and 9? 12 and 9? 22 and 9? 32 and 9? 42 and 9? 52 and 9? 62 and 9? 72 and 9? 82 and 9? 92 and 9?

3. How many are 3 and 9? 13 and 9? 23 and 9? 33 and 9? 43 and 9? 53 and 9? 63 and 9? 73 and 9? 83 and 9? 93 and 9?

4. How many are 4 and 9? 14 and 9? 24 and 9? 34 and 9? 44 and 9? 54 and 9? 64 and 9? 74. and 9? 84 and 9? 94 and 9?

5. How many are 5 and 9? 15 and 9? 25 and 9? 35 and 9? 45 and 9? 55 and 9? 65 and 9? 75 and 9? 85 and 9? 95 and 9?

6. How many are 6 and 9? 16 and 9? 26 and 9? 36 and 9? 46 and 9? 56 and 9? 66 and 9? 76 and 9? 86 and 9? 96 and 9?

7. How many are 7 and 9? 17 and 9? 27 and 9? 37 and 9? 47 and 9? 57 and 9? 67 and 9? 77 and 9? 87 and 9? 97 and 9?

8. How many are 8 and 9? 18 and 9? 28 and 9? 38 and 9? 48 and 9? 58 and 9? 68 and 9? 78 and 9? 88 and 9? 98 and 9?

9. How many are 9 and 9? 19 and 9? 29 and 9? 39 and 9? 49 and 9? 59 and 9? 69 and 9? 79 and 9? 89 and 9? 99 and 9?

10. How many are 10 and 9? 20 and 9? 30 and 9? 40 and 9? 50 and 9? 60 and 9? 70 and 9? 80 and 9? 90 and 9? 90 and 10?

Lesson 11.

1. How many are 13 and 8? 15 and 7? 14 and 9? 16 and 6? 18 and 5? 17 and 8? 19 and 7? 12 and 9? 18 and 9? 17 and 6?

2. How many are 21 and 9? 25 and 6? 23 and 8? 26 and 7? 28 and 9? 25 and 7? 24 and 7? 27 and 9? 26 and 8? 23 and 9?

3. How many are 33 and 9? 36 and 8? 32 and 9? 37 and 6? 39 and 6? 36 and 9? 35 and 6? 34 and 8? 38 and 7? 37 and 9?

4. How many are 42 and 8? 47 and 4? 49 and 5? 43 and 7? 45 and 8? 48 and 6? 46 and 7? 47 and 7? 44 and 9? 48 and 8?

5. How many are 54 and 8? 52 and 9? 57 and 6? 53 and 7? 58 and 5? 56 and 8? 54 and 8? 55 and 7? 59 and 9? 58 and 7?

6. How many are 66 and 9? 69 and 6? 64 and 8? 68 and 6? 65 and 8? 63 and 9? 67 and 8? 66 and 8? 69 and 3? 68 and 5?

7. How many are 75 and 6? 74 and 9? 79 and 4? 77 and 6? 75 and 9? 73 and 9? 78 and 5? 76 and 7? 78 and 9? 75 and 7?

8. How many are 82 and 9? 85 and 6? 89 and 9? 86 and 7? 87 and 4? 85 and 7? 84 and 8? 83 and 7? 86 and 6? 87 and 9?

9. How many are 68 and 8? 76 and 5? 47 and 6? 28 and 4? 35 and 8? 24 and 9? 56 and 4? 57 and 9? 65 and 7? 69 and 4?

10. How many are 84 and 7? 87 and 3? 88 and 9? 79 and 6? 88 and 8? 79 and 9? 33 and 7? 46 and 8? 57 and 7? 64 and 9?

Lesson 12.

1. Tom has 8 marbles in one pocket and 13 in another ; how many marbles has he in both pockets ?

2. How many dollars must I pay for a coat worth 21 dollars and trousers worth 9 dollars ?

3. Frank planted 33 rows of corn, and Edward only 9 rows ; how many rows did both boys plant ?

4. One of my bundles weighs 15 pounds, and the other 7 pounds ; how many pounds do both weigh ?

5. A man pays 42 dollars for a suit of clothes for himself and 8 dollars for a suit for a boy ; how many dollars does he pay for both suits ?

6. There are 35 pounds of nails in a keg and 8 pounds in a box ; how many pounds in all ?

7. One family uses 28 quarts of milk in a week, another 9 quarts ; how many quarts do both use ?

8. Irving had 39 cents and received 6 cents more ; how many cents had he then ?

9. There are 56 words on one page and only 8 on another ; how many words are there on both pages ?

10. A grocer sold 35 pounds of sugar and 6 pounds of coffee ; how many pounds of sugar and coffee did he sell ?

11. Mary takes 9 stitches in a minute, while her mother takes 28 ; how many stitches do both take in a minute ?

12. In my fence there are 9 posts and 33 rails ; how many posts and rails are there ?

13. There are 7 days in one week and 84 days in twelve weeks ; how many days are there in thirteen weeks ?

Lesson 13.

1. I put 7 potatoes into a basket that had 46 potatoes ; how many potatoes were in the basket then ?

2. How many scholars are there in a school of 52 girls and 9 boys ?

3. I saw 68 cows and 8 horses ; how many animals did I see ?

4. A boy counted 79 flies and 6 hornets ; how many insects did he count ?

5. A farmer has 33 apple trees and 7 pear trees ; how many trees of both kinds has he ?

6. John has 69 hens and 6 ducks ; how many fowls has he ?

7. A woman knits 48·mittens and 8 gloves ; how many mittens and gloves does she knit ?

8. Maud gathered 36 pansies and 9 roses ; how many flowers did she gather ?

9. There are 24 chairs and 9 tables in the building ; how many chairs and tables together are there ?

10. I have 73 books and 9 pamphlets ; how many books and pamphlets together have I ?

11. One piece of ice weighs 47 pounds, another 6 pounds ; how many pounds do both pieces weigh ?

12. One tree bore 85 oranges, another bore only 7 ; how many oranges did both trees bear ?

13. I read 89 pages before dinner and 9 pages after dinner ; how many pages did I read in all ?

14. There are 84 apples on the ground ; how many will there be when 8 more have fallen ?

15. I had 86 cents and found 9 more ; how many cents had I then ?

1. A merchant travels 6 miles by stage, 5 miles by rail, and 4 miles by boat; how many miles does he travel ?

2. A butcher sells 8 pounds of steak to one family, 5 pounds to another, and 6 pounds to another; how many pounds does he sell to the three families ?

3. How many quarts of blackberries are picked by a boy who brings home 4 quarts on Monday, 3 quarts on Tuesday, and 6 quarts on Wednesday ?

4. A lady spent 3 dollars for gloves, 5 dollars for boots, and 7 dollars for a hat; how many dollars did she pay for all ?

5. A milkman has 8 quarts of milk in one can, 5 quarts in another, and 6 quarts in another; how many quarts has he in the three cans ?

6. A grocer put up 11 pounds of sugar, 5 pounds of coffee, and 3 pounds of butter; how many pounds did all weigh ?

7. Arthur has in his collection 8 butterflies, 7 moths, and 4 beetles; how many insects has he in all ?

8. How many trees are there in a street where 7 oaks, 6 maples, and 5 elms are planted ?

9. A lawyer collected 7 dollars from one man, 5 dollars from another, and 6 dollars from another; how many dollars did he collect from the three men ?

10. A gardener picked 7 quarts of strawberries from one bed, 8 quarts from another, and 6 quarts from another; how many quarts did he pick ?

11. A drover bought 14 sheep, 7 cows, and 4 pigs; how many animals did he buy ?

1. James dug 8 bushels of potatoes, Frank 5 bushels, and Henry 9 bushels; how many bushels did the three boys dig?

2. Sarah paid 8 cents for pins, 4 cents for thread, and 9 for needles; how many cents did she spend?

3. From a nest of eggs George gave 7 to his mother, 5 to his aunt, and 3 to a poor woman; how many eggs did he find?

4. On a telegraph-pole there are 9 wires on the lower cross-piece, 7 on the middle one, and 5 on the upper one; how many wires are there on the pole?

5. A liveryman has an omnibus carrying 12 persons, a hack carrying 6, and a cab carrying 3; how many persons will the three carry?

6. Walter goes to the post-office with 10 cents for car fare, 8 cents for postage, and 5 cents to spend; how many cents has he in all?

7. Helen spent 6 cents, Grace 7, and Annie 9; how many cents did the three girls spend?

8. A farmer sold 15 bushels of potatoes, 4 of onions, and 3 of turnips; how many bushels of vegetables did he sell?

9. If there are 12 books on one shelf, 7 on another, and 5 on another, how many books are there in all?

10. An agent sold an album for 5 dollars, a Bible for 9 dollars, and a history for 8 dollars; how many dollars did he receive for the three books?

11. A woman puts up 11 cans of peaches, 12 of raspberries, and 5 of cherries; how many cans does she put up?

1. It is 3 feet from the ground to the sills of a house, 16 feet from the sills to the eaves, and the ridgepole is 8 feet above the eaves; how many feet from the ground is the ridgepole?

2. A stovepipe has two bends. The first straight piece is 8 feet, the second 14 feet, and the third 9 feet; how many feet are there in the stovepipe?

3. A man pays 18 dollars for a coat, 8 dollars for trousers, and 4 dollars for a vest; how many dollars does he pay for the suit?

4. A sled is worth 5 dollars, a gun 11 dollars, and a boat 20 dollars; what is the value of the three?

5. There are 17 gallons of oil in one can, 10 gallons in another, and 8 gallons in another; how many gallons are there in all?

6. One granite block is 12 feet high, another is 9 feet, and another is 7 feet; how high a monument can be made by the three blocks?

7. A farmer has 15 acres under cultivation, 10 acres in woodland, and 9 acres in pasture; how many acres are there in his farm?

8. A milkman has 13 red cows, 8 black ones, and 7 black and white; how many cows has he in all?

9. If I owe my grocer 12 dollars, my butcher 7 dollars, and my baker 6 dollars, how many dollars do I owe the three together?

10. In a certain book 12 pages are given to addition, 10 pages to subtraction, and 12 pages to multiplication; how many pages are given to the three processes?

Lesson 17.

SUBTRACTION TABLE

1	2	3	4	5	6	7	8	9	10
−1	−1	−1	−1	−1	−1	−1	−1	−1	−1

2	3	4	5	6	7	8	9	10	11
−2	−2	−2	−2	−2	−2	−2	−2	−2	−2

3	4	5	6	7	8	9	10	11	12
−3	−3	−3	−3	−3	−3	−3	−3	−3	−3

4	5	6	7	8	9	10	11	12	13
−4	−4	−4	−4	−4	−4	−4	−4	−4	−4

5	6	7	8	9	10	11	12	13	14
−5	−5	−5	−5	−5	−5	−5	−5	−5	−5

6	7	8	9	10	11	12	13	14	15
−6	−6	−6	−6	−6	−6	−6	−6	−6	−6

7	8	9	10	11	12	13	14	15	16
−7	−7	−7	−7	−7	−7	−7	−7	−7	−7

8	9	10	11	12	13	14	15	16	17
−8	−8	−8	−8	−8	−8	−8	−8	−8	−8

9	10	11	12	13	14	15	16	17	18
−9	−9	−9	−9	−9	−9	−9	−9	−9	−9

NOTE. The Teacher should copy this Subtraction Table on the board, and require *each pupil in turn* to name the differences as the pointer touches the examples at random. The drill should be continued daily until every pupil is absolutely certain of the required answer.

Lesson 18.

1. William had 3 slate pencils, but gave 1 to his brother ; how many had he left ?

2. Kate had 5 cents, but spent 2 cents for a lead-pencil ; how many cents had she left ?

3. Sarah had 5 rose-bushes, but 3 of them were killed by the frost ; how many remained ?

4. I found 6 eggs, but 3 of them were bad ; how many were good ?

5. A flock of 7 wild ducks were swimming in a pond ; a man shot 2 of them, the rest flew away ; how many flew away ?

6. Mr. Shaw had 8 cows. After he had sold 5 of them, how many did he have ?

7. There were 9 trees in front of Mr. Hall's house. After 4 were cut down, how many remained ?

8. Harry received 10 cents for picking the stones off the lawn, but had to pay his brother 4 cents for helping him ; how many cents had Harry left ?

9. Henry's mother gave him 11 cents ; after spending 2 cents for a top, how many has he left ?

10. A hen had 12 chickens until a hawk killed 4 of them ; how many were left ?

11. Gertrude had 9 pansies, but gave 3 to her teacher ; how many had she then ?

12. There were 11 birds in a tree, but a boy frightened away 4 ; how many were left ?

13. Frank had 8 apples, and gave 3 to Fred; how many had Frank then ?

14. Two boys earned 10 cents ; one of them earned 3 ; how many did the other earn ?

Lesson 19.

1. Lewis picked 13 quarts of berries, 4 quarts more than Frank picked ; how many quarts did Frank pick ?

2. Mrs. Jones puts up 11 cans of berries ; 5 cans are raspberries and the rest blueberries ; how many cans of blueberries are there ?

3. Mary is 14 years old ; her brother is 5 years younger ; how old is her brother ?

4. One monument is 12 feet high, another is 8 feet ; how many feet higher is one than the other ?

5. A grocer sells 4 gallons of vinegar from a keg containing 10 gallons ; how many gallons are left ?

6. In a flock of 12 ducks and geese there are 5 geese ; how many ducks are there ?

7. A man having 15 dollars pays 8 dollars for a railroad ticket ; how many dollars has he left ?

8. It is 4 miles from Boston to Chelsea, and 11 miles from Boston to Lynn ; how much farther is it from Boston to Lynn than from Boston to Chelsea ?

9. From a board 16 feet long a carpenter cuts off a piece 12 feet long; how many feet are left ?

10. A farmer gave 7 apples to John and 13 to Helen ; how many more has Helen than John ?

11. If in an orchard containing 18 peach trees 5 trees are blighted, how many trees are healthy ?

12. A hen sits on 16 eggs; 7 eggs spoil, the rest hatch ; how many chickens are hatched ?

13. In a stable of 17 horses 6 have distemper; how many are well ?

14. Of 18 loaves of bread a baker sells all but 7 ; how many loaves does he sell ?

Lesson 20.

1. From 19 gallons of kerosene 9 gallons leaked out ; how many gallons remained ?

2. A boy has 9 stamps; how many must he buy to make the number 17 ?

3. George has 16 marbles, which is 9 more than Frank has ; how many has Frank ?

4. A man walks 15 miles in a day ; if he walks 9 miles in the forenoon, how many miles does he walk in the afternoon ?

5. I paid 14 dollars for a table and 5 dollars for a chair ; how many more dollars did I pay for the table than for the chair ?

6. A milkman had 18 cows ; how many did he have after selling 9 of them ?

7. Of a flock of 17 turkeys how many were left after a fox carried off 8 ?

8. Alice has 16 roses ; 7 are white, the rest red; how many are red ?

9. After I have walked 11 miles, how many shall I have to walk to make 19 miles ?

10. If Fred had 8 more marbles he would have 15; how many marbles has he ?

11. One train has 9 cars and another has 16; how many more cars has one than the other ?

12. Frank caught 17 trout, and Henry caught 8 ; how many more did Frank catch than Henry ?

13. Lucy is 14 years old; how old was she 6 years ago ?

14. There are 15 rolls on the table before supper, and only 3 after supper ; how many rolls were eaten ?

Lesson 21.

1. If I had 9 more children, I should have 14; how many children have I?

2. A cook had 13 eggs, but used 6 for a pudding; how many eggs were left?

3. My father and mother together gave me 18 cents; my mother gave me 12 cents; how many did my father give me?

4. I have in my pocket 16 cents; one piece is a ten-cent piece, and the others are one-cent pieces; how many one-cent pieces have I?

5. Tom picked 12 quarts of cherries, Ida picked 7; how many more quarts did Tom pick than Ida?

6. Charles had 15 cents, but spent 10 cents for candy; how many cents had he left?

7. I paid 17 cents postage on two bundles; the postage on one was 6 cents; how much was the postage on the other?

8. In a class of 16 scholars, 5 are boys and the rest are girls; how many girls are there?

9. Ned had 13 marbles, but gave away 5; how many had he then?

10. Ralph had 18 papers to deliver; he has delivered 14; how many has he to deliver?

11. If in two pods there were 12 peas, and in one of the pods there were 6 peas, how many were there in the other pod?

12. Julia had 14 yards of ribbon, but has used 5 yards; how many yards remain?

13. A newsboy had 17 papers. After he had sold 8 of them, how many had he left?

Lesson 22.

1. There were 14 eggs in the nest, but 11 were bad; how many were good?

2. From sap that I gathered I made 17 cakes of maple sugar; after giving away 9 cakes, how many had I?

3. Ned paid 19 dollars for a second-hand bicycle and sold it for 8 dollars; how many dollars did he lose?

4. By the direct road the distance to the city is 14 miles; by the indirect it is 19 miles. How much shorter is the direct road?

5. It took me 15 minutes to skate up to the bridge against the wind, but only 6 minutes to skate back; how many more minutes did it take me to skate up?

6. Our Nine made 15 runs, the other Nine made 9 runs; by how many runs did we beat?

7. There were in the room 7 chairs and 16 persons; how many persons had to stand?

8. In a certain year all but 6 of the 14 scholars came from out of town; how many came from out of town?

9. A boy had to go to a town 13 miles away. He rode 8 miles, but had to walk the rest of the way. How many miles did he walk?

10. I spent 12 dollars for wood and coal. If I paid 7 dollars for coal, how much did I pay for wood?

11. Mary has 14 cents, and spends 5 cents for a spool of silk. How many cents has she left for ribbon?

Lesson 23.

1. Of 13 cats and kittens, 5 were kittens ; how many were cats ?

2. A farmer brought 16 dozen eggs to market, and sold all but 4 dozen ; how many dozen did he sell ?

3. I have 18 lines of poetry to learn. After I have learned 14 lines, how many lines shall I have to learn ?

4. Three boys, Tom, Dick, and Harry, picked 17 quarts of berries. Tom picked 5 quarts, and Dick picked 5 quarts. How many quarts did Harry pick ?

5. In a certain garden there are 18 trees, 6 of which are pear, 7 peach, and the rest cherry. How many cherry trees are there ?

6. A boy paid 8 cents for some oranges and sold them for 12 cents ; how many cents did he make ?

7. In a flock of 16 sheep and lambs there are 7 lambs ; how many sheep are there ?

8. Three boys picked up 15 bushels of potatoes. If one boy picked up 6 bushels, how many bushels did the other two boys pick up ?

9. I have 19 minutes for play, but it takes me 7 minutes to make up my mind what to play. How many minutes remain ?

10. From a flock of 17 lambs 8 were sold ; how many lambs were left ?

11. A boy has 16 cents. If he spends 9 of them, how many cents will he have left ?

12. Henry, James, and Reuben have together 18 cents. Henry has 4 cents and James has 5 ; how many has Reuben ?

Lesson 24.

1. How many are $7-6$? $17-6$? $27-6$?
$37-6$? $47-6$? $57-6$? $67-6$? $77-6$?
$87-6$? $97-6$?

2. How many are $8-6$? $18-6$? $28-6$?
$38-6$? $48-6$? $58-6$? $68-6$? $78-6$?
$88-6$? $98-6$?

3. How many are $9-6$? $19-6$? $29-6$?
$39-6$? $49-6$? $59-6$? $69-6$? $79-6$?
$89-6$? $99-6$?

4. How many are $10-6$? $20-6$? $30-6$?
$40-6$? $50-6$? $60-6$? $70-6$? $80-6$?
$90-6$? $100-6$?

5. How many are $11-6$? $21-6$? $31-6$?
$41-6$? $51-6$? $61-6$? $71-6$? $81-6$?
$91-6$? $101-6$?

6. How many are $12-6$? $22-6$? $32-6$?
$42-6$? $52-6$? $62-6$? $72-6$? $82-6$?
$92-6$? $102-6$?

7. How many are $13-6$? $23-6$? $33-6$?
$43-6$? $53-6$? $63-6$? $73-6$? $83-6$?
$93-6$? $103-6$?

8. How many are $14-6$? $24-6$? $34-6$?
$44-6$? $54-6$? $64-6$? $74-6$? $84-6$?
$94-6$? $104-6$?

9. How many are $15-6$? $25-6$? $35-6$?
$45-6$? $55-6$? $65-6$? $75-6$? $85-6$?
$95-6$? $105-6$?

10. How many are $16-6$? $26-6$? $36-6$?
$46-6$? $56-6$? $66-6$? $76-6$? $86-6$?
$96-6$? $106-6$?

Lesson 25.

1. How many are 8 — 7 ?   18 — 7 ?   28 — 7 ?
38 — 7 ?   48 — 7 ?   58 — 7 ?   68 — 7 ?   78 — 7 ?
88 — 7 ?   98 — 7 ?

2. How many are 9 — 7 ?   19 — 7 ?   29 — 7 ?
39 — 7 ?   49 — 7 ?   59 — 7 ?   69 — 7 ?   79 — 7 ?
89 — 7 ?   99 — 7 ?   .

3. How many are 10 — 7 ?   20 — 7 ?   30 — 7 ?
40 — 7 ?   50 — 7 ?   60 — 7 ?   70 — 7 ?   80 — 7 ?
90 — 7 ?   100 — 7 ?

4. How many are 11 — 7 ?   21 — 7 ?   31 — 7 ?
41 — 7 ?   51 — 7 ?   61 — 7 ?   71 — 7 ?   81 — 7 ?
91 — 7 ?   101 — 7 ?

5. How many are 12 — 7 ?   22 — 7 ?   32 — 7 ?
42 — 7 ?   52 — 7 ?   62 — 7 ?   72 — 7 ?   82 — 7 ?
92 — 7 ?   102 — 7 ?

6. How many are 13 — 7 ?   23 — 7 ?   33 — 7 ?
43 — 7 ?   53 — 7 ?   63 — 7 ?   73 — 7 ?   83 — 7 ?
93 — 7 ?   103 — 7 ?

7. How many are 14 — 7 ?   24 — 7 ?   34 — 7 ?
44 — 7 ?   54 — 7 ?   64 — 7 ?   74 — 7 ?   84 — 7 ?
94 — 7 ?   104 — 7 ?

8. How many are 15 — 7 ?   25 — 7 ?   35 — 7 ?
45 — 7 ?   55 — 7 ?   65 — 7 ?   75 — 7 ?   85 — 7 ?
95 — 7 ?   105 — 7 ?

9. How many are 16 — 7 ?   26 — 7 ?   36 — 7 ?
46 — 7 ?   56 — 7 ?   66 — 7 ?   76 — 7 ?   86 — 7 ?
96 — 7 ?   106 — 7 ?

10. How many are 17 — 7 ?   27 — 7 ?   37 — 7 ?
47 — 7 ?   57 — 7 ?   67 — 7 ?   77 — 7 ?   87 — 7 ?
97 — 7 ?   107 — 7 ?

Lesson 26.

1. How many are 9 — 8 ?   19 — 8 ?   29 — 8 ?
39 — 8 ?   49 — 8 ?   59 — 8 ?   69 — 8 ?   79 — 8 ?
89 — 8 ?   99 — 8 ?   109 — 8 ?

2. How many are 10 — 8 ?   20 — 8 ?   30 — 8 ?
40 — 8 ?   50 — 8 ?   60 — 8 ?   70 — 8 ?   80 — 8 ?
90 — 8 ?   100 — 8 ?

3. How many are 11 — 8 ?   21 — 8 ?   31 — 8 ?
41 — 8 ?   51 — 8 ?   61 — 8 ?   71 — 8 ?   81 — 8 ?
91 — 8 ?   101 — 8 ?

4. How many are 12 — 8 ?   22 — 8 ?   32 — 8 ?
42 — 8 ?   52 — 8 ?   62 — 8 ?   72 — 8 ?   82 — 8 ?
92 — 8 ?   102 — 8 ?

5. How many are 13 — 8 ?   23 — 8 ?   33 — 8 ?
43 — 8 ?   53 — 8 ?   63 — 8 ?   73 — 8 ?   83 — 8 ?
93 — 8 ?   103 — 8 ?

6. How many are 14 — 8 ?   24 — 8 ?   34 — 8 ?
44 — 8 ?   54 — 8 ?   64 — 8 ?   74 — 8 ?   84 — 8 ?
94 — 8 ?   104 — 8 ?

7. How many are 15 — 8 ?   25 — 8 ?   35 — 8 ?
45 — 8 ?   55 — 8 ?   65 — 8 ?   75 — 8 ?   85 — 8 ?
95 — 8 ?   105 — 8 ?

8. How many are 16 — 8 ?   26 — 8 ?   36 — 8 ?
46 — 8 ?   56 — 8 ?   66 — 8 ?   76 — 8 ?   86 — 8 ?
96 — 8 ?   106 — 8 ?

9. How many are 17 — 8 ?   27 — 8 ?   37 — 8 ?
47 — 8 ?   57 — 8 ?   67 — 8 ?   77 — 8 ?   87 — 8 ?
97 — 8 ?   107 — 8 ?

10. How many are 18 — 8 ?   28 — 8 ?   38 — 8 ?
48 — 8 ?   58 — 8 ?   68 — 8 ?   78 — 8 ?   88 — 8 ?
98 — 8 ?   108 — 8 ?

Lesson 27.

1. How many are $10 - 9$? $20 - 9$? $30 - 9$?
$40 - 9$? $50 - 9$? $60 - 9$? $70 - 9$? $80 - 9$?
$90 - 9$? $100 - 9$?

2. How many are $11 - 9$? $21 - 9$? $31 - 9$?
$41 - 9$? $51 - 9$? $61 - 9$? $71 - 9$? $81 - 9$?
$91 - 9$? $101 - 9$?

3. How many are $12 - 9$? $22 - 9$? $32 - 9$?
$42 - 9$? $52 - 9$? $62 - 9$? $72 - 9$? $82 - 9$?
$92 - 9$? $102 - 9$?

4. How many are $13 - 9$? $23 - 9$? $33 - 9$?
$43 - 9$? $53 - 9$? $63 - 9$? $73 - 9$? $83 - 9$?
$93 - 9$? $103 - 9$?

5. How many are $14 - 9$? $24 - 9$? $34 - 9$?
$44 - 9$? $54 - 9$? $64 - 9$? $74 - 9$? $84 - 9$?
$94 - 9$? $104 - 9$?

6. How many are $15 - 9$? $25 - 9$? $35 - 9$?
$45 - 9$? $55 - 9$? $65 - 9$? $75 - 9$? $85 - 9$?
$95 - 9$? $105 - 9$?

7. How many are $16 - 9$? $26 - 9$? $36 - 9$?
$46 - 9$? $56 - 9$? $66 - 9$? $76 - 9$? $86 - 9$?
$96 - 9$? $106 - 9$?

8. How many are $17 - 9$? $27 - 9$? $37 - 9$?
$47 - 9$? $57 - 9$? $67 - 9$? $77 - 9$? $87 - 9$?
$97 - 9$? $107 - 9$?

9. How many are $18 - 9$? $28 - 9$? $38 - 9$?
$48 - 9$? $58 - 9$? $68 - 9$? $78 - 9$? $88 - 9$?
$98 - 9$? $108 - 9$?

10. How many are $19 - 9$? $29 - 9$? $39 - 9$?
$49 - 9$? $59 - 9$? $69 - 9$? $79 - 9$? $89 - 9$?
$99 - 9$? $109 - 9$?

Lesson 28.

How many are

23	35	33	37	32	31	28
−4	−9	−5	−9	−7	−3	−9

24	27	21	22	46	26	35
−8	−8	−7	−6	−7	−9	−6

36	41	43	42	51	55	61
−8	−4	−5	−7	−5	−7	−6

34	45	63	71	80	82	86
−7	−8	−6	−7	−9	−3	−7

75	48	70	98	74	64	94
−7	−9	−7	−9	−7	−5	−8

87	42	96	67	73	72	95
−9	−9	−7	−9	−6	−9	−6

62	85	73	85	91	93	64
−3	−6	−7	−8	−9	−8	−8

56	55	75	86	80	87	93
−7	−7	−9	−9	−3	−8	−4

83	35	61	85	83	80	43
−8	−6	−7	−7	−7	−8	−9

51	73	92	52	72	61	82
−8	−6	−9	−8	−7	−8	−7

Lesson 29.

1. In a school of 23 pupils 9 are boys, and the rest girls ; how many girls are there ?

2. In a grove of 27 trees 8 were blown down in a storm ; how many remained standing ?

3. A farmer having 32 sheep sold 7 to a drover; how many remained ?

4. Joseph has 9 cents and Maggie has 27 cents ; how many must be given to Joseph that he may have as many as Maggie ?

5. The sum of two numbers is 35 ; one number is 8 ; what is the other number ?

6. I have 9 dollars towards a bicycle that costs 42 dollars ; how many more dollars do I need to buy the bicycle ?

7. A man receives 30 dollars for a week's work, and a boy receives 9 dollars ; how many dollars does the man receive more than the boy ?

8. A florist has 37 roses, 9 of which are white, and the rest red; how many are red ?

9. I had 21 tons of hay, but sold 8 tons ; how many tons remained ?

10. A garden has 56 hills of corn and squashes; there are 8 hills of squashes ; how many hills of corn are there ?

11. I give a man 25 dollars in payment for a suit of clothes, and he gives me back 9 dollars in change ; what is the price of the suit ?

12. A freight train of 27 cars starts from Boston for New York ; 9 cars are left on the way ; how many cars go through ?

Lesson 30.

1. A drover starts with 53 sheep, but 8 stray away ; how many are left ?

2. A city has 73 miles of streets, all but 9 miles of which are paved ; how many miles are paved ?

3. A father is 32 years old and his son 5 ; how much older is the father than his son ?

4. Two boys bought a ball for 75 cents ; one paid 8 cents ; how many cents did the other pay ?

5. Of a flock of 93 sparrows, all but 7 were killed ; how many were killed ?

6. By selling a watch for 81 dollars I make a profit of 9 dollars ; what did the watch cost me ?

7. I have gained 7 pounds in two months, and now weigh 76 pounds ; how many pounds did I weigh two months ago ?

8. John is 8 inches shorter than his brother Henry ; Henry is 63 inches tall ; how tall is John ?

9. This month has 31 days, but 7 days are gone ; how many days remain ?

10. Of the 82 guests present only 8 made speeches ; how many did not make speeches ?

11. In a class of 55 pupils, 6 failed to graduate ; how many graduated ?

12. A book had 98 pages, but 9 are torn out ; how many pages remain ?

13. There were 87 passengers when the train started, but only 8 when it reached the last station ; how many stopped on the way ?

14. I had 34 marbles, but lost all but 7 ; how many did I lose ?

Lesson 31.

1. I gave the ticket agent a 20-dollar bill for a ticket that costs 7 dollars. How many dollars ought I to receive in exchange?

2. A man started on a journey with 85 dollars. After he had spent 9 dollars how many dollars had he?

3. John has earned 8 dollars towards paying for a 65-dollar bicycle. How many more dollars must he earn?

4. My father put 83 pounds of ice into his refrigerator in the morning, but only 5 pounds remained the next morning. How many pounds had melted?

5. In a party of 41 children 6 belonged to one family. How many belonged to the other families?

6. There are 62 buildings in a certain village, 6 of which are stores. How many are not stores?

7. If I sleep 8 of the 24 hours a day, how many hours remain for other purposes?

8. If the sum of two numbers is 57, and one number is 9, what is the other number?

9. What must be added to 8 to make 87?

10. The distance from Athol to North Adams is 61 miles, and from Hoosac Tunnel to North Adams 8 miles. How far is it from Athol to Hoosac Tunnel?

11. I travelled 92 miles. The first 7 miles I rode in a carriage, and the remainder in the cars. How far did I ride in the cars?

12. I give the hotel clerk 40 dollars, and he gives me back 6. How much is my bill?

Lesson 32.

MULTIPLICATION TABLE

2 times	3 times	4 times	5 times
1 are 2	1 are 3	1 are 4	1 are 5
2 are 4	2 are 6	2 are 8	2 are 10
3 are 6	3 are 9	3 are 12	3 are 15
4 are 8	4 are 12	4 are 16	4 are 20
5 are 10	5 are 15	5 are 20	5 are 25
6 are 12	6 are 18	6 are 24	6 are 30
7 are 14	7 are 21	7 are 28	7 are 35
8 are 16	8 are 24	8 are 32	8 are 40
9 are 18	9 are 27	9 are 36	9 are 45
10 are 20	10 are 30	10 are 40	10 are 50
11 are 22	11 are 33	11 are 44	11 are 55
12 are 24	12 are 36	12 are 48	12 are 60

6 times	7 times	8 times	9 times
1 are 6	1 are 7	1 are 8	1 are 9
2 are 12	2 are 14	2 are 16	2 are 18
3 are 18	3 are 21	3 are 24	3 are 27
4 are 24	4 are 28	4 are 32	4 are 36
5 are 30	5 are 35	5 are 40	5 are 45
6 are 36	6 are 42	6 are 48	6 are 54
7 are 42	7 are 49	7 are 56	7 are 63
8 are 48	8 are 56	8 are 64	8 are 72
9 are 54	9 are 63	9 are 72	9 are 81
10 are 60	10 are.70	10 are 80	10 are 90
11 are 66	11 are 77	11 are 88	11 are 99
12 are 72	12 are 84	12 are 96	12 are 108

1. 9 times 12 are 108. How many are 12 times 9 ? 8 times 11 are 88. How many are 11 times 8 ?

2. 11 times 12 are 132. How many are 12 times 11 ? 12 times 12 are 144. How many are 12 dozen ? 10 times 11 are 110. How many are 11 times 11 ?

3. George has 2 rabbits, and Henry has 6 times as many. How many has Henry ?

4. What must be paid for 7 yards of silk velvet at 2 dollars a yard ?

5. A boy picks 3 quarts of blackberries every day. How many quarts will he pick in 6 days ?

6. What will 8 pencils cost at 3 cents each ?

7. What must I pay for 9 two-cent postage stamps ?

8. A plumber earns 3 dollars a day. How much does he earn in 6 days ?

9. There are 4 quarts in one gallon. How many quarts are there in 7 gallons ?

10. If there are 4 panes of glass in one window, how many panes are there in 9 windows ?

11. What will 6 cords of wood cost at 4 dollars a cord ?

12. In 8 five-dollar bills how many dollars are there ?

13. If a farmer cuts 5 tons of hay on 1 acre, how many tons will he cut on 6 acres ?

14. How much will 9 quarts of milk cost at 5 cents a quart ?

15. A fly has 6 legs. How many legs have 6 flies ?

16. How many pounds of butter will there be in 8 six-pound packages ?

Lesson 34.

1. A horse goes 6 miles in 1 hour. How far will he go in 7 hours ?

2. How much must be paid for 4 tons of coal at 6 dollars a ton ?

3. If a yard of muslin costs 6 cents, what will 12 yards cost ?

4. If 6 persons can sit on 1 bench, how many can sit on 8 benches ?

5. A restaurant uses 6 dozen eggs a day. How many dozen will it use in 7 days ?

6. In a week there are 7 days. How many days are there in 7 weeks ?   In 9 weeks?

7. How many pounds of grapes are there in 8 boxes weighing 7 pounds each ?

8. At 6 cents each what will 9 oranges cost?

9. If a man pays 7 dollars rent each month, how much will he pay in a year, or 12 months ?

10. A horse travels 7 miles an hour, and a railroad train travels five times as fast.   How far does the train travel in an hour ?

11. If mackerel are worth 7 cents each, how much must be paid for 6 of them ?

12. If a family uses 8 cents' worth of oil in a day, how much will it use in 3 days?

13. A carpenter saws a board into 4 lengths of 8 feet each.   How long was the board ?

14. If a clerk copies 8 pages a day, how many pages will he copy in 5 days ?   In 8 days ?

15. If a barge can carry 12 persons, how many persons can 9 barges carry ?

Lesson 35.

1. A farmer sells 12 dozen of green corn at 8 cents a dozen. What does he receive ?

2. Charles's hens lay 8 eggs a day. How many will they lay in 6 days ?

3. If 1 can of milk contains 8 quarts, how many quarts will 8 cans contain ?

4. Each of 7 children has 8 dollars. How many dollars have all the children ?

5. What shall I have to pay for 12 bottles of ink at 8 cents a bottle ?

6. If 1 turkey weighs 8 pounds, how much will 11 turkeys of the same size weigh ?

7. At 9 cents a bunch, how much will 2 bunches of celery cost ?

8. How many hills of corn are there in 2 rows of 9 hills each ?

9. What is the distance round a three-sided field each of whose sides is 9 feet ?

10. A steamer sails 9 miles an hour. How far will it sail in 6 hours, at the same rate ?

11. How much will 8 pounds of fish cost at 9 cents a pound ?

12. Each length of a rail-fence is 9 feet. How many feet are there in 9 lengths ?

13. If a compositor sets 9 pages of type in 1 day, how many pages will he set in 5 days ?

14. A laborer earns 9 dollars a week. How much will he earn in 7 weeks ? In 11 weeks ?

15. Find the cost of 2 melons at 10 cents each.

1. What must I pay for 3 pairs of blankets at 10 dollars a pair ?

2. A dime is 10 cents.   How many cents are there in 6 dimes ?

3. How many cords are there in 4 piles of wood, each pile containing 10 cords ?

4. At 10 dollars a barrel what will a grocer receive for 9 barrels of flour ?

5. What will 12 yards of cloth cost at 10 cents a yard ?

6. If a bushel of charcoal is worth 11 cents, what are 2 bushels worth ?

7. A farmer sets out 3 rows of trees with 11 trees in each row.   How many trees does he set out ?

8. If cranberries are selling at 11 cents a quart, what must I pay for 3 quarts ?   For 5 quarts ?

9. A boy rides 11 miles an hour on his bicycle. How far will he ride in 11 hours, at the same rate ?

10. If a man and his wife pay 11 dollars a week for board, how much will they pay in 6 weeks ?

11. A drover sells 9 head of cattle at a profit of 11 dollars each.   What is his profit on all the cattle ?

12. Eight boys each catch 11 fish.   How many do all catch ?

13. What will a boy receive for 2 quarts of berries at 12 cents a quart ?

14. There are 12 eggs in 1 dozen.   How many are there in 3 dozen ?   In 5 dozen ?

15. There are 12 inches in a foot.   How many inches are there in 4 feet ?   In 6 feet ?

1. At 12 cents an hour, how much will a boy earn in 8 hours ?

2. If a cow produces 12 pounds of butter a week, how many pounds will she produce in 10 weeks ?

3. If steel rails are 12 feet long, how far will 12 such rails reach if placed end to end ?

4. There are 12 books on each of 9 shelves of a book-case. How many books are there in all ?

5. How many acres are there in 4 fields of 12 acres each ?

6. If a man works 12 hours a day for 6 days, how many hours does he work in all ?

7. If I get 12 pounds of honey from 1 hive of bees, how many pounds shall I get from 7 hives, at the same rate ?

8. How much milk will 9 twelve-quart cans hold ?

9. Three feet make a yard. How many feet are there in 9 yards ?

10. At 9 dollars a month, how much will a girl earn in 3 months ? In 4 months ? In 6 months ?

11. A man walks 4 miles an hour. How far will he walk in 7 hours ?

12. A horse travels 7 miles an hour. How far will he travel in 4 hours ?

13. What will 12 sheep cost at 5 dollars each ?

14. If a grocer buys eggs at 12 cents a dozen and sells them at 15 cents a dozen, how much will he gain on 6 dozen ?

15. If a boy picks 12 quarts of blackberries a day, how many quarts will he pick in 6 days ?

1. How many hours will it take one man to do the work which 8 men do in 12 hours ?

2. A printer receives 25 dollars a month, but spends 13 dollars. How much will he save in a year, or 12 months ?

3. If a barrel of flour lasts 12 persons 1 month, how long will it last 1 person ?

4. If 1 horse eats 2 bushels of grain a week, how many bushels will 8 horses eat ?

5. If 1 person eats 2 ears of corn, how many ears will be required for 12 persons ?

6. If 3 pipes fill a tank in seven hours, how long will it take 1 pipe to fill it ?

7. At 7 dollars a ton, what must I pay for 9 tons of coal ?

8. At 8 cents a quart, what will 8 quarts of blueberries cost ?

9. At 6 cents a quart, what will 9 quarts of milk cost ?

10. At 7 cents a pound, what will 8 pounds of rice cost ?

11. If it takes a boy 5 minutes to walk a certain distance, how many minutes will it take him to walk 6 times as far ?

12. A spider has 8 legs. How many legs have 6 spiders ?

13. What must I pay for 9 cords of wood at 5 dollars a cord ?

14. James has 7 cents. John has 7 times as many cents. How many cents has John ?

Lesson 39.

1. How many seats are in 7 rows of 9 seats each ?

2. At 7 cents a quart, what must I pay for 8 quarts of beans ?

3. If a freight train averages 8 miles an hour, how many miles will it run in 8 hours ?

4. At 8 dollars apiece, what will 12 calves cost ?

5. What must I pay for 12 two-cent postage stamps ?

6. If I pay 5 dollars for a vest, twice as much for trousers, and twice as much for coat as for trousers, how much do I pay for the suit ?

7. If a family uses 9 pounds of sugar a week, how many pounds will it use in 9 weeks ?

8. If it takes 6 eggs for a cake, how many eggs will be required for 11 cakes ?

9. If a man sleeps 8 hours every night, how many hours will he sleep in 7 nights, or one week ?

10. A farmer sold 8 pigs at 3 dollars each. How much did he receive ?

11. How many trees are there in an orchard of 12 rows, 12 trees in a row ?

12. At an average of 12 examples on a page, how many examples will there be on 9 pages ?

13. What will 12 quarts of beans cost at 7 cents a quart ?

14. If a peck of oats weighs 8 pounds, how much will 4 pecks, or a bushel, weigh ?

15. At 11 dollars a ton, what will 12 tons of cannel coal cost?

16. At 11 cents apiece, what will 11 cakes cost ?

Lesson 40.

DIVISION TABLE.

$2 \div 2 = 1$	$3 \div 3 = 1$	$4 \div 4 = 1$	$5 \div 5 = 1$
$4 \div 2 = 2$	$6 \div 3 = 2$	$8 \div 4 = 2$	$10 \div 5 = 2$
$6 \div 2 = 3$	$9 \div 3 = 3$	$12 \div 4 = 3$	$15 \div 5 = 3$
$8 \div 2 = 4$	$12 \div 3 = 4$	$16 \div 4 = 4$	$20 \div 5 = 4$
$10 \div 2 = 5$	$15 \div 3 = 5$	$20 \div 4 = 5$	$25 \div 5 = 5$
$12 \div 2 = 6$	$18 \div 3 = 6$	$24 \div 4 = 6$	$30 \div 5 = 6$
$14 \div 2 = 7$	$21 \div 3 = 7$	$28 \div 4 = 7$	$35 \div 5 = 7$
$16 \div 2 = 8$	$24 \div 3 = 8$	$32 \div 4 = 8$	$40 \div 5 = 8$
$18 \div 2 = 9$	$27 \div 3 = 9$	$36 \div 4 = 9$	$45 \div 5 = 9$

$6 \div 6 = 1$	$7 \div 7 = 1$	$8 \div 8 = 1$	$9 \div 9 = 1$
$12 \div 6 = 2$	$14 \div 7 = 2$	$16 \div 8 = 2$	$18 \div 9 = 2$
$18 \div 6 = 3$	$21 \div 7 = 3$	$24 \div 8 = 3$	$27 \div 9 = 3$
$24 \div 6 = 4$	$28 \div 7 = 4$	$32 \div 8 = 4$	$36 \div 9 = 4$
$30 \div 6 = 5$	$35 \div 7 = 5$	$40 \div 8 = 5$	$45 \div 9 = 5$
$36 \div 6 = 6$	$42 \div 7 = 6$	$48 \div 8 = 6$	$54 \div 9 = 6$
$42 \div 6 = 7$	$49 \div 7 = 7$	$56 \div 8 = 7$	$63 \div 9 = 7$
$48 \div 6 = 8$	$56 \div 7 = 8$	$64 \div 8 = 8$	$72 \div 9 = 8$
$54 \div 6 = 9$	$63 \div 7 = 9$	$72 \div 8 = 9$	$81 \div 9 = 9$

Lesson 41.

1. At 2 cents each, how many pears can I buy for 4 cents ?

2. If a man walks 8 miles in 2 hours, how far will he walk in one hour ?

3. If I pay 10 dollars for 2 weeks' board, what is the rate a week ?

4. If a boy picks 12 quarts of berries in 2 days, how many quarts does he pick in one day ?

5. Two dozen screws cost 14 cents. What is the price of one dozen ?

6. When bananas sell for 3 cents each, how many can be bought for 15 cents ?

7. At 6 dollars a cord, how many cords of wood can be bought for 18 dollars ?

8. If a family uses 24 pounds of butter in 3 weeks, how many pounds will it use in one week ?

9. With 30 dollars, at 6 dollars a cord, how many cords of wood can I buy ?

10. A grocer sells 48 gallons of molasses in 6 days. What is his average sale each day ?

11. How many four-cent stamps can I buy for 40 cents ?

12. Two yards of ribbon cost 24 cents. What is the price of one yard ?

13. Mary's grandmother is 72 years old, 9 times as old as Mary. How old is Mary ?

14. At 10 cents a pound, how much fish can be bought for 30 cents ?

15. A horse eats 90 quarts of oats in 9 days. How many quarts does he eat in one day ?

1. At the rate of 12 miles an hour, how many hours will a freight train require to run 36 miles ?

2. How many weeks will it take a man to earn 96 dollars if he earns 12 dollars each week ?

3.' How many men will be required to do a piece of work in 3 days which one man can do in 36 days ?

4. When eggs are selling at 12 cents a dozen, how many dozen can be bought for 60 cents ?

5. Divide 21 oranges equally among 3 boys. How many oranges will each boy receive ?

6. How many three-cent stamps can I buy for 27 cents ?

7. There are 24 feet in eight yards. How many feet are there in one yard ?

8. I pay 36 cents for 4 quarts of berries.. What is the price of one quart ?

9. Frank pays 28 cents for 4 cakes of maple sugar. What is the price of one cake ?

10. If it takes 32 days for one man to build a wall, how many days will it take 4 men ?

11. At 6 cents a quart, how many quarts of milk can I buy for 42 cents ?

12. In 5 bushels there are 20 pecks. How many pecks are there in one bushel ?

13. At 7 dollars a ton, how many tons of coal can be bought for 56 dollars ?

14. If 5 gallons of oil cost 60 cents, what is the price of one gallon ?

15. When melons are 12 cents each, how many can be bought for 72 cents ?

Lesson 43.

1. One bottle of ink costs 8 cents. How many bottles can be bought for 64 cents ?

2. A boy works 9 weeks and receives 36 dollars. At the same rate, what would he receive for 1 week ? for 2 weeks ? for 3 weeks ?

3. At 5 cents a pound, how many pounds of sugar can be bought for 55 cents ?

4. In 12 hours 108 horses cross a certain bridge. What is the average number an hour ?

5. There are 132 examples on 11 pages. What is the average number on one page ?

6. If a blacksmith can shoe 66 horses in 6 days, how many horses can he shoe in 12 days ?

7. I pay 144 cents for an advertisement of 12 lines. What is the rate per line ?

8. A farmer sold 6 barrels of apples for 18 dollars. At the same price, what would he receive for 24 barrels ?

9. During the term a teacher orders 48 books for a class of 12 pupils. What is the average number of books required for one pupil ?

10. My hens lay 54 eggs a week, an average of 6 for each hen. How many hens have I ?

11. A secretary wrote 72 letters in 6 days. What was the average number that he wrote in one day ?

12. My horse travelled 42 miles in 7 hours. What was his rate per hour ?

13. After subtracting 16 from 100, there will remain a number 7 times the age of my oldest son. How old is he ?

1. For 6 dozen of eggs at 12 cents a dozen, a woman received 9 yards of cloth. What was the price of the cloth per yard ?

2. A farmer exchanged 10 cords of wood at 6 dollars a cord for 12 barrels of flour. What was the price of the flour per barrel ?

3. How many pounds of sugar at 6 cents a pound should be received in exchange for 9 quarts of berries at 8 cents a quart ?

4. I paid 70 dollars for 10 weeks' board. What was the rate per week ? per day ?

5. If a quantity of provisions will last 1 man 72 days, how long will it last 12 men ?

6. If you add 6 to 78, how many times 12 will you have ?

7. How many days will 11 men need to do a piece of work which 1 man can do in 88 days ?

8. How many tons of coal at 8 dollars a ton must be given for 12 cords of wood at 6 dollars a cord ?

9. When 4 tons of coal are worth 24 dollars, 10 tons are exchanged for 12,000 shingles. What is the price of the shingles per thousand ?

10. If 4 barrels of sugar are worth 48 dollars, how many cords of wood at 6 dollars a cord must be given for 2 barrels of sugar ?

11. On his way to market with 14 lambs, a drover lost 5. At what rate must he sell the remainder to receive 45 dollars ?

12. Find the cost of 7 yards of cloth when 5 yards cost 60 cents.

Lesson 45.

1. I have 25 cents with which to buy two-cent stamps. How many stamps can I buy, and how much money shall I have left ?

2. A boy with 12 cents bought 2 dozen rubber rings at 5 cents a dozen. How many rings did he buy, and what sum had he left ?

3. At 7 dollars a ton, how many tons of coal can I buy for 63 dollars ?

4. How many yards of muslin at 12 cents a yard can a girl buy for 108 cents ?

5. How many peaches at 10 cents a dozen can I buy for 25 cents ?

6. What is the smallest number that must be taken from 25 to leave a number exactly divisible by 3 ?

7. A boy exchanged 9 quarts of chestnuts at 10 cents a quart for twelve quires of paper, and received 6 cents in money. What was the price of the paper per quire ?

8. How many yards of velvet at 5 dollars a yard can a milliner buy for 59 dollars, and how much money will she have left?

9. How many pounds of sugar at 6 cents a pound can I buy for 75 cents, and how much money shall I have left ?

10. If I give a conductor a fifty-cent piece for 8 six-cent fares, how much ought he to give me back?

11. A lady received 4 dollars from 4 ten-dollar bills after paying for coal at 6 dollars a ton. How many tons did she buy ?

Lesson 46.

Name the quotient and the remainder of

$3 \div 2$	$5 \div 3$	$6 \div 4$	$12 \div 5$
$5 \div 2$	$8 \div 3$	$9 \div 4$	$18 \div 5$
$7 \div 2$	$11 \div 3$	$15 \div 4$	$23 \div 5$
$9 \div 2$	$13 \div 3$	$19 \div 4$	$29 \div 5$
$11 \div 2$	$19 \div 3$	$27 \div 4$	$31 \div 5$
$15 \div 2$	$23 \div 3$	$29 \div 4$	$43 \div 5$
$17 \div 2$	$29 \div 3$	$37 \div 4$	$49 \div 5$
$19 \div 2$	$31 \div 3$	$39 \div 4$	$57 \div 5$
$21 \div 2$	$35 \div 3$	$43 \div 4$	$59 \div 5$
$23 \div 2$	$37 \div 3$	$49 \div 4$	$62 \div 5$
$9 \div 6$	$13 \div 7$	$15 \div 8$	$17 \div 9$
$13 \div 6$	$17 \div 7$	$21 \div 8$	$23 \div 9$
$17 \div 6$	$25 \div 7$	$33 \div 8$	$39 \div 9$
$27 \div 6$	$39 \div 7$	$45 \div 8$	$47 \div 9$
$31 \div 6$	$48 \div 7$	$51 \div 8$	$56 \div 9$
$43 \div 6$	$51 \div 7$	$59 \div 8$	$68 \div 9$
$55 \div 6$	$59 \div 7$	$63 \div 8$	$71 \div 9$
$59 \div 6$	$65 \div 7$	$77 \div 8$	$78 \div 9$
$65 \div 6$	$78 \div 7$	$89 \div 8$	$85 \div 9$
$73 \div 6$	$83 \div 7$	$95 \div 8$	$89 \div 9$

1. I have 55 buttons to arrange in six equal rows. How many must I put in a row, and how many shall I have left?

2. A foreman receives 7 dollars for 2 days' work. What is his rate a day?

3. If a freight train runs 24 miles in 2 hours, how far will it run in 4 hours?

4. At 8 cents a quart, how many quarts of beans can be bought for 60 cents, and how much of the money will be left?

5. If 9 sheep cost 54 dollars, what is the cost of 12 sheep?

6. I pay 36 dollars for 4 tons of cannel coal. What will be the cost of 12 tons?

7. If I pay 32 cents for a can of 8 quarts of milk, what will be the cost of 7 quarts?

8. How long will 84 pounds of sugar last a family that uses 12 pounds a week?

9. If you sleep 24 hours in 3 nights, how many hours at the same average will you sleep in 12 nights?

10. A man receives 45 dollars for 5 loads of bricks. What will be the cost of 7 loads?

11. If a man can build 84 yards of fence in 6 days, how many yards can he build in 3 days?

12. A dealer sold 4 plows for 32 dollars. What will be the cost of 7 plows?

13. Nine tons of coal cost 63 dollars. What is the cost of 7 tons?

14. There are 8 quarts in one peck, and 4 pecks in one bushel. How many bushels in 64 quarts?

1. If 4 pounds of sugar cost 28 cents, what will 11 pounds cost ?

2. A boy has 10 quarts of berries at 8 cents a quart to exchange for oil at 10 cents a gallon. How much oil will he receive ?

3. At the rate of 10 miles in 3 hours, how far will a man row in 9 hours ?

4. If a horse can travel 36 miles in 6 hours, how far will he travel in 12 hours ?

5. If a man walks 12 miles in 3 hours, what is his rate an hour ?   How far will he walk in 7 hours ?

6. A boy has 35 cents with which to buy 3 pencils at 5 cents each and 2 blank books at 8 cents each. How much money will he have left ?

7. Sixteen apples are divided among 4 boys. How many apples will 3 boys get ?

8. Thirty-six yards of cloth are needed for 12 coats.   How many yards are needed for 24 coats ?

9. If 2 pencils cost 8 cents, how many can be bought for 25 cents ?   How much money will be left ?

10. A field of 100 acres is divided into 25 equal lots.   How many acres does each lot contain ?

11. Four persons wish to share equally a bill of 38 dollars.   How much must each pay ?

12. If 5 tons of coal cost 35 dollars, what is the cost of 9 tons ?

13. The pay-roll for 12 men amounts to 30 dollars a day.   What does each man receive ?

14. At the rate of 54 cents for 6 pencils, what will 12 pencils cost ?

Lesson 49.

1. At 7 dollars a ton, how many tons of coal can I buy for 50 dollars, and how much money will be left ?

2. From 150 dollars I have 6 dollars left after paying 12 men. What is the average sum paid each man ?

3. If 4 bushels of potatoes are worth 1 bushel of wheat, and 6 bushels of wheat are worth 1 barrel of flour, how many bushels of potatoes must be given for 2 barrels of flour ?

4. If a certain field is divided into 6 equal parts, each part will contain 6 acres. How many acres will there be in each part if the field is divided into 4 equal parts ?

5. If John's money is divided into 8 equal parts there will be 4 cents in each part. How many cents will there be in each part if it is divided into 4 equal parts ? into 2 equal parts ? into 16 equal parts ?

6. If 8 men can build a fence in one day, how many men must be employed to build it in 2 days ?

7. If 8 men can build a fence in 2 days, how many men must be employed to build it in one day ?

8. If it takes 8 men 4 days to build a fence, how many days will it take 4 men to build it ? 16 men ?

9. If 6 men can build a barn in 40 days, in how many days can 8 men build it ?

10. If 3 men can mow a certain field in 12 days, how many days will it take 4 men to mow it ?

11. If 8 men can build a certain wall in 9 days, how many men will build it in 3 days ?

12. If the value of 8 sheep is 72 dollars, what is the value of 6 of the sheep ?

CHAPTER II.

COMPOUND QUANTITIES.

Lesson 1.

UNITED STATES MONEY.

TABLE.

10 mills = one cent.
10 cents = one dime.
10 dimes = one dollar.
100 cents = one dollar.

The coins in common use are the cent, the nickel (five cents), the dime (ten cents), the quarter (twenty-five cents), the half (fifty cents), the dollar (one hundred cents).

The dollar sign ($) is placed before the figures.

The dot, or decimal point, is placed between the dollars and the cents ; thus, $5.50 is read "five dollars and fifty cents."

1. How many cents are there in a quarter of a dollar ?   How many are there in a half-dollar ?

2. How many two-cent postage stamps can I buy for 25 cents ?   Shall I have any money left ?

3. One dozen cedar pencils cost 10 cents.   How many dozen can I buy for one dollar ?

4. If I give a five-dollar bill in payment for boots that cost $4.50, how much change shall I receive?

5. What will 5 quires of paper cost at 25 cents a quire ?

6. A boy buys a gallon of oil for 10 cents, a pound of soda for 10 cents, and a yeast cake for 2 cents. If he gives a quarter in payment, how much change will he receive ?

Lesson 2.

1. What will 9 barrels of flour cost at $5.10 a barrel ?

2. At the rate of $3.15 each, how much will 5 hats cost ?

3. What will 4 pounds of beefsteak cost at 25 cents a pound ?

4. A boy has earned $15.50 towards the purchase of a bicycle that cost $25. How much more must he earn ?

5. A man buys a coat for $12.50 and a vest for $5.50. He gives in payment two ten-dollar bills. How much change ought he to receive ?

6. A man gives four ten-dollar bills in payment for the use of a hall six nights at $6 a night. How much change must he receive ?

7. What will 5 pounds of coffee cost at 30 cents a pound ?

8. What will 4 tons of coal cost at $7.25 a ton ?

9. At $3.50 a cord, how many cords of pine wood can be bought for $7 ?

10. At the rate of 2 cents a mile, what will a mileage book of 1000 miles cost ?

11. What will be the amount of my hotel bill for four days at the rate of $2.50 a day ?

12. Five times 20 cents are how many times 25 cents ?

13. A carpenter receives 25 cents an hour. How much will he receive for 6 hours' work ?

14. A boy is paid 15 cents an hour for raking leaves. How much will he earn in 7 hours ?

Lesson 3.

1. John goes to town with $1. He pays 50 cents for sugar, 10 cents for soda, 15 cents for codfish, and the remainder for a book. What does he pay for the book?

2. I offer a five-dollar bill in payment for books. One book costs $1.25, another 75 cents, another 50 cents. How much change ought I to receive?

3. How much must I pay for two railroad tickets at $1.20 each and three half-tickets at 60 cents each?

4. I buy a mileage book for $20, a hat for $4, a pair of boots for $3.50, and a pair of overshoes for $3.50. How much do I spend?

5. At the rate of 2 cents a mile for each person, how much will it cost 4 persons to ride 51 miles?

6. I buy a turkey weighing 10 pounds, give in payment a two-dollar bill and receive in change 20 cents. What is the price of the turkey a pound?

7. My friend pays $20 for a mileage book. After he uses it on a road that charges 2 cents a mile, he sells the book to me for $18.70. How many miles did he ride?

8. I give a ten-dollar bill in payment for three books of equal value and receive $2.50 in change. What is the price of each book?

9. I buy three books. The second costs twice as much as the first, and the third twice as much as the second. The third costs $10. What is the cost of each of the others, and of all together?

10. If a man receives $1.50 for 6 hours work, what is the rate per hour?

Lesson 4.

1. A boy has $3 in ten-cent pieces. How many pieces has he?

2. How many five-cent postage stamps can be bought for $1.50?

3. At 25 cents a dozen, how many dozen oranges can be bought for $1.25?

4. At the rate of three apples for 2 cents how many apples can be bought for $1?

5. I spend $1 for postage stamps. The number of one-cent stamps that I buy is equal to the number of cents that I pay for the two-cent stamps. How many stamps of each kind do I buy?

6. How much postage must I pay on 25 letters at 2 cents each, 20 newspapers at 1 cent each, fifteen circulars at 1 cent each, and a book at 20 cents?

7. I have 5 five-dollar bills. How much money shall I have left after paying my tailor $18.50, my shoemaker $5.50, and my barber 25 cents?

8. If a workman is paid at the rate of $2.50 a day, how many days must he work to earn enough to pay his doctor's bill of $25?

9. What will 3000 cubic feet of gas cost at $2.30 a thousand?

10. One person gives $5 towards a present that costs $10.50, another gives $3, and another gives the remainder. How much does the third person give?

11. A boy receives $1 from his mother, twice as much from his father, and twice as much from his sister as from his father. How much does he receive?

Lesson 5.

LIQUID MEASURE.

Liquid Measure is used in measuring liquids, as water, milk, etc.

TABLE.

4 gills (gi.) = 1 pint (pt.).
2 pints   = 1 quart (qt.).
4 quarts   = 1 gallon (gal.).
Hence, 1 gal. = 4 qts. = 8 pts. = 32 gi.

1. From a cask that held 24 gallons and 2 quarts, 2 gallons and 2 quarts were drawn off. How much was left in the cask?

2. I paid a farmer 68 cents for making my cider. He charged 2 cents a gallon. How many gallons did I have?

3. A milkman sells a large can (two gallons) of milk for 32 cents. What is the rate a quart?

4. Is it cheaper to buy a large can (two gallons) of milk at 35 cents, or 8 quarts at 5 cents a quart?

5. If oil is 12 cents a gallon, what will a quart cost?

6. Pure vanilla sells for $1.50 a pint. What would a quart cost at the same rate? A gallon?

7. Thirty gallons of syrup cost $27. What was the rate a gallon?

8. If alcohol sells for 60 cents a quart, what must I pay for a pint? For a gallon?

9. If 1 pint of cologne costs $1, how much will a gallon cost? A gill?

10. At the rate of 90 cents a quart, how much must I pay for a gallon of olive oil?

Lesson 6.

1. There are 63 gallons in a hogshead. If a cistern holds 100 hogsheads, how many gallons does it hold ?

2. What must I pay for 31 gallons of milk at 5 cents a quart ?

3. A man pays $4.80 for a cask of vinegar. If the cask holds 24 gallous what is the rate a gallon ?

4. If a dealer pays $2 for a 10-gallon cask of vinegar, what is the rate a quart ?

5. How many bottles, each holding 1 gill, can be filled with a quart of ink ?

6. My lamp holds 1 pint. How many times can I fill it with a gallon of oil ?

7. If a pint of oil lasts me two nights, how many quarts shall I burn in 16 nights ?

8. One quart of raspberries when cooked will fill a pint can. How many quarts of raspberries when cooked will be required to fill 4 one-quart cans ?

9. From my two-quart pitcher full of water I can fill eight glasses. How much does each glass hold ?

10. How large must eight bottles of equal size be to contain exactly two gallons of syrup?

11. The tub which I use for a rain gauge is 4 inches deep, and holds 10 quarts. When it is filled to the depth of 1 inch, how many pints of water are there in it ?

12. If oil is 16 cents a gallon, how much will 2 gallons and 2 quarts cost?

13. My milk bill for 30 days is $6. If I pay 4 cents a quart, how many quarts of milk do I buy per day ?

DRY MEASURE.

Dry Measure is used in measuring dry articles, as grain, seeds, fruit, vegetables.

TABLE.

2 pints (pt.) = 1 quart (qt.).
8 quarts   = 1 peck (pk.).
4 pecks   = 1 bushel (bu.).

Hence 1 bu. = 4 pks. = 32 qts.

1. How much must I pay for 5 bags of oats, 2 bushels in a bag, at 50 cents a bushel?

2. I paid $10 for some bags of potatoes, 2 bushels in a bag, at $1 a bushel. How many bags were there?

3. If on returning the bags I receive 10 cents each, how much will the potatoes actually cost me?

4. How many four-quart measures can be filled with a bushel of corn?

5. If I give my hens 2 quarts of corn a day, how many days will a bushel last?

6. How many days will 5 bags of oats, two bushels in a bag, last a man who feeds his horse 10 quarts a day?

7. If 2 quarts of salt are used in freezing 4 quarts of cream, how many quarts of salt will be used in freezing 4 gallons? How many pecks?

8. A man paid $2.50 for a load of sawdust containing 25 bushels. What was the rate a bushel?

9. If 12 onions fill a four-quart measure, how many onions of the same size will fill a bushel?

Lesson 8.

1. How much more will a peck of blueberries cost at 10 cents a quart than at 75 cents a peck?

2. From a bushel basket of pears, three pecks are sold. How many pecks remain? How many quarts?

3. If a bushel of peas in the pod make 4 quarts when shelled, how many quarts will 3 pecks make?

4. What must I pay for 4 bushels of potatoes at 75 cents a bushel?

5. How many blackberries at 10 cents a quart must be given for 2 books at 25 cents each?

6. A boy receives 5 cents a bushel for picking up potatoes. How many bushels must he pick up to earn $1.25?

7. A farmer sells 2 bushels of Bartlett pears for $2. If he had to pay 25 cents a bushel for picking, what is his profit?

8. If a bushel of coal costs 25 cents, how many bushels can be bought for $1.50?

9. A dealer buys beans at $2.50 a bushel, and sells them at 10 cents a quart. How much does he gain on a bushel?

10. I paid 20 cents for a peck of salt. What was the rate a bushel?

11. At the rate of 5 cents a pint, what must be paid for 2 quarts of peanuts?

12. Hulled corn is 6 cents a quart. How much must I pay for 16 quarts?

13. A boy buys a peck of popping corn for 50 cents, pops it, and sells it at 5 cents a bag. If he has 40 bags, how much does he make?

Lesson 9.

AVOIRDUPOIS WEIGHT.

Avoirdupois Weight is used in weighing all articles except gold, silver, and precious stones.

TABLE.

16 ounces (oz.)	= 1 pound (lb.).
2000 pounds	= 1 ton (t.).

1. From 42 pounds of butter three lots of 12 pounds each are sold. How much is left?

2. I paid 20 cents a pound for a twenty-pound firkin of butter. For how much a pound must I sell it in order to gain $1?

3. At 25 cents a pound, what will 5 pounds of beef-steak cost?

4. How much must I pay for 10 tons of coal at $7.50 a ton?

5. If hay sells at $20 a ton, what is the price of one pound? one hundred weight?

6. I bought hay at the rate of 80 cents a hundred. What was the price of a ton?

7. If a dealer buys 8 tons of coal for $32, and sells it at 20 cents a bushel, 80 pounds to the bushel, how much will he make?

8. If it takes 5 bushels of wheat to make a barrel of flour, how many bushels will it take to make 12 barrels of flour?

9. Is it cheaper to buy 4 quarter-barrels of flour at $1.50 each, or a barrel for $5.50?

10. A bushel of potatoes weighs 60 pounds. What will one peck weigh?

Lesson 10.

1. If 4 quarts of oats weigh 4 pounds, how much will a bushel weigh ?

2. A grocer gives 20 lbs. of sugar for $1. What is the rate a pound ?

3. At 50 cents a pound, how many pounds of tea can be bought for $2 ?

4. If a pound of maple sugar would make a pint of syrup, would it be cheaper to buy sugar at 12 cents a pound, or syrup at $1 a gallon ? How much cheaper ?

5. If 12 candles weigh a pound, how much will 120 candles weigh ?

6. If 72 candles weigh 12 pounds, how many candles will weigh 1 pound ?

7. A boy goes to the store with a five-dollar bill. He buys a bag of sugar for $1, a pound of tea for 50 cents, a pound of soda for 10 cents, and a pound of coffee for 40 cents. How many dollars has he left ?

8. How many pounds of sugar at 5 cents a pound must be given for 8 dozen eggs at 25 cents a dozen?

9. How many tons of coal at $7.50 a ton can be bought for 5 cords of wood at $6 a cord ?

10. If 1 bushel of oats weighs 32 pounds, what would be the weight of a bag containing 80 quarts?

11. How much must I pay for 2 chickens, each weighing 3 pounds at 20 cents a pound ?

12. Should I make more by selling a quintal of fish (100 pounds) for $10, or at 11 cents a pound ?

13. Eight packages of equal weight are made of 4 pounds of tea. How many ounces does each package weigh ?

TROY WEIGHT.

Troy Weight is used in weighing gold, silver, and precious stones.

TABLE.

24 grains (grs.)	= 1 pennyweight (dwt.).
20 pennyweights	= 1 ounce (oz.).
12 ounces	= 1 pound (lb.).

1. How many spoons weighing 20 pennyweights each can be made from 10 ounces of silver ? From 1 pound ?

2. If an ounce of silver is worth 60 cents, what is a pound worth ?

3. How many tablespoons weighing 3 ounces each can be made from 6 pounds of silver ?

4. If 40 tablespoons of equal weight are made from 10 pounds of silver, how many ounces will each spoon weigh ?

5. If silver is worth 3 cents a pennyweight, what must I pay for one ounce ?

6. If gold were worth $20 an ounce, what would a pennyweight cost ?

7. How many pennyweights of silver at 3 cents each would have to be given for 1 pennyweight of gold worth 96 cents ?

8. If I buy gold dust at 2 cents a grain and sell it at 50 cents a pennyweight, do I gain or lose ?

9. If in every ounce 15 pennyweights are silver and the rest alloy, how many pennyweights are alloy in a mug that weighs 10 ounces ?

Lesson 12.

LONG MEASURE.

Long Measure is used in measuring lines or distances.

TABLE.

12 inches (in.)   = 1 foot (ft.).
3 feet   = 1 yard (yd.).
*5½ yards, or 16½ feet = 1 rod (rd.).
320 rods   = 1 mile (mi.).
Hence, 1 mi = 320 rods = 1760 yds. = 5280 ft.

* NOTE.   5½ is read five and a half.

1. In a coil of picture cord measuring 10 yards, how many feet are there ?   How many inches ?

2. My table measures 5 feet one way and 3 feet the other.   What is the distance round it ?

3. At the rate of two cents an inch, what will a two-foot rule cost ?

4. What must I pay for 60 feet of border at 5 cents a yard ?

5. How many yards of border will it take to go round a room 12 feet wide arfd 15 feet long ?

6. At $1 a yard what will be the cost of 5 strips of carpet, each 5 yards long ?

7. What must I pay for 10 feet of galvanized pipe at 14 cents a foot ?

8. Is it cheaper to buy a roll (10 yards) of tape for 25 cents, or at the rate of 3 cents a yard ?

9. How many yards of cloth at $3 a yard must be given for 6 barrels of flour at $5 a barrel ?

10. If a man walks 4 miles an hour, how many hours will it take him to walk 48 miles ?

Lesson 13.

1. If concrete of the width of my walk costs 75 cents a yard, what must I pay for 10 yards ?

2. A lady buys 10 yards of dress goods at 50 cents a yard, and 20 yards of trimming at 5 cents a yard; if she gives in payment a ten-dollar bill, how much change ought she to receive ?

3. At eight cents a foot, what will moulding cost for a picture measuring 12 inches one way and 14 the other, allowing 8 inches extra for the corners ?

4. How many yards of fence will be required for a four-sided field measuring 33 feet one way and 66 the other ? What will it cost at $1 a yard ?

5. At 50 cents a yard, what must I pay for curtains for a room containing 4 windows, each 2 yards long ?

6. A lady paid $48 for silk for a dress. If it cost $3 a yard, how many yards did she buy ?

7. If a child steps one foot at each step, how many steps will he take in walking a mile ?

8. What must I pay for 25 feet of rope for a swing, at 4 cents a foot ?

9. At the rate of 2 cents a mile, how many miles can I ride for $1 ?

10. If one page is 10 inches long, how many pages placed in a row will extend 5 feet ?

11. At the rate of 15 cents a foot, what will it cost me to lay a pipe from my house to the street, a distance of 10 yards ?

12. It is 5 miles between two stations on a railroad. How many rods is it ?

Lesson 14.

SQUARE MEASURE.

Square Measure is used in measuring surfaces.

TABLE.

144 square inches (sq. in.) = 1 square foot (sq. ft.).
   9 square feet   = 1 square yard (sq. yd.).
*30¼ square yards, or } = 1 square rod (sq. rd.).
272¼ square feet   }
160 square rods, or } = 1 acre (A.).
  10 square chains }
640 acres   = 1 square mile (sq. mi.).
Hence, 1 A. = 160 sq. rds. = 4840 sq. yds. = 43,560 sq. ft.

* NOTE. 30¼ is read thirty and a quarter.

1. Since there are 10 square chains in one acre, how many acres are there in 50 square chains?

2. At the rate of 5 cents a square foot, what must be paid for 100 square feet of boards?

3. If a certain kind of flooring costs 20 cents a square foot, how much will 20 square feet cost?

4. Since 160 square rods make an acre and 10 square chains make an acre, how many square rods make a square chain?

5. How many square feet of wire screen can be bought for 90 cents, at 2 cents a square foot? How many square yards?

6. I paid a man $1.50 for mowing 2 acres of grass. What was the rate per acre?

7. If potatoes yield 75 bushels to the acre, how many bushels ought a man to receive from 4 acres?

8. How many lots of 40 square rods each can be made from an acre?

Lesson 15.

AREAS.

The **area** of any surface is the **number of units of area** the given surface contains.

The **unit of area** is a square, the side of which is some given *unit of length.*

Find the area of a rectangle 2 ft. by 3 ft.:

The rectangle can be divided into 6 squares, each square being 1 ft. on a side.
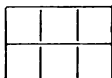
Therefore the area required is 2×3 sq. ft. $= 6$ sq. ft.

In finding the area of a rectangle :

We express the length and breadth in units of the same name, and multiply the number of units in the length by the number of units in the breadth; the product of these two numbers will be the number of square units of that name.

1. What is the area of one side of an envelope measuring 5 inches one way and 3 inches the other ?

2. What must I pay for leather at 12 cents a square foot to cover the top of my desk, which measures 4 feet one way and 3 feet the other ?

3. If zinc sells for 10 cents a square foot, how much must I pay for a piece 6 feet long and 3 feet wide to put under my stove ?

4. At the rate of 6 cents a square yard, what will it cost to cover with sods a plot of ground 10 yards long and 8 yards wide ?

5. How many square rods are there in a field 40 rods square ?   How many acres ?

Lesson 16.

CUBIC MEASURE.

Cubic Measure is used in measuring solids.

TABLE.

1728 cubic inches (cu. in.) = 1 cubic foot (cu. ft.).
27 cubic feet   = 1 cubic yard (cu. yd.).

WOOD MEASURE.

TABLE.

16 cubic feet = 1 cord foot (cd. ft.).
8 cord feet = 1 cord (cd.).
Therefore, 128 cubic feet = 1 cord.

1. Find the cost of 9 cords of wood at $6 a cord.

2. I paid $18 for a pile of pine wood, at the rate of $3 a cord; how many cords were there in the pile ?

3. For how much a cord must I sell a pile of wood containing 12 cords, that I may receive $60 ?

4. A pile of wood 4 feet high, 4 feet wide, and 8 feet long contains a cord. If a pile is 4 feet long and 4 feet wide, how high must it be to contain a cord ?

5. If it costs 25 cents to build a cubic foot of brick wall, how much will it cost to build 8 cubic feet ?

6. If it costs 54 cents to dig a cubic yard of clay, how much will it cost to dig a cubic foot ?

7. At the rate of 10 cents a cubic yard, a man earned $20 for digging a cellar; how many cubic yards did he dig ?

8. If a cubic foot of clay will make 10 bricks, how many bricks can be made from a cubic yard ?

VOLUMES.

The volume of any solid is the number of units of volume the given solid contains.

The unit of volume is a cube, the edge of which is some given *unit of length.*

In finding the volume of a rectangular solid:

We express the length, breadth, and thickness in units of the same name; then we multiply the number of units in the length by the number of units in the breadth, and this product by the number of units in the thickness; the product of these numbers will be the number of cubic units of that name.

1. My inkstand measures 2 inches one way, 2 inches another, and 2 inches another; how many cubic inches are there in it?

2. Find the number of cubic inches in a brick 3 inches thick, 4 inches wide, and 8 inches long.

3. Find the number of cubic feet in a cake of ice 1 foot thick, 2 feet wide, 3 feet long.

4. What is the capacity of a coal bin 4 feet wide, 5 feet high, and 8 feet long?

5. If a bunch of envelopes 5 inches long and 3 inches wide is 1 inch thick, how many bunches will be required to make a pile containing 90 cubic inches?

6. The capacity of a certain box is 100 cubic feet; one of the dimensions is 4 feet, another 5 feet. What is the third?

7. Find the capacity of a drawer 10 inches wide, 10 inches long, and 4 inches deep.

8. What is the volume of a mound of earth 12 feet long, 10 feet wide, and 10 feet high?

Lesson 18.

TIME MEASURE.

Time Measure is used in measuring duration.

TABLE.

60 seconds (sec.)	= 1 minute (min.).
60 minutes	= 1 hour (hr.).
24 hours	= 1 day (dy.).
7 days	= 1 week (wk.).
365 days (or 52 wks. 1 dy.)	= 1 common year (yr.).
366 days	= 1 leap-year.
100 years	= 1 century.

1. Since there are 7 days in one week, how many days are there in 12 weeks? How many weeks in 63 days? in 84 days?

2. If a man walks 20 miles a day, how far will he walk in 3 days? In 4 days? In a week?

3. If a train goes a mile a minute, how long will it be going 60 miles?

4. If a boy earns $1 a day and spends 10 cents, how much will he have left at the end of a week?

5. If a man works 10 hours a day, how many hours a day will be left for other things?

6. How many minutes are there in 5 hours?

7. If a working day is 8 hours, which is the better rate, 20 cents an hour or $1.50 a day?

8. A boy who picks 4 quarts of berries in an hour has picked 12 quarts. How many hours was he picking?

9. If one ton of coal lasts a family two weeks, how many weeks will twelve tons last? How many tons will be required to last six months, reckoning four weeks to a month?

1. If a train runs 20 miles in 30 minutes, what is its rate per hour? How far will it run in 3 hours?

2. If it takes a boy one minute to slide down a hill and five minutes to walk up, how many times can he slide down and return in an hour? In two hours?

3. If it takes 2 men 3 days to do a piece of work, how long will it take 1 man? 3 men?

4. If one man can do a piece of work in 30 days, how long will it take 3 men? 6 men?

5. If a man can do a piece of work in 48 hours, how many days will it take him, working 8 hours a day? How many weeks, reckoning 6 working days?

6. If a man walks 4 miles an hour and a horse travels 8 miles an hour, how many miles will the horse go while the man walks 12 miles?

7. If the interest of $1 is 4 cents a year, in how many years will the interest be 48 cents?

8. If a quantity of provisions will last 10 men 12 days, how long will it last one man? 12 men?

9. How long will it take me to save $24, if I save $2 a week?

10. How many days are there in 9 weeks?

11. If I walk 16 miles at the rate of 4 miles an hour and without stopping ride back at the rate of 8 miles an hour, how long shall I have been gone?

12. If 2 pipes will empty a cistern in 12 hours, how long will it take 6 pipes of the same size to empty it? how long will it take 12 pipes?

13. If 2 men can do a piece of work in 16 days, how long will it take 4 men to do twice as much?

Lesson 20.

1. A bag of corn meal weighs 100 pounds. How many bags will weigh a ton ?

2. If a brick weighs 4 pounds, how many tons will a load of 1000 bricks weigh ?

3. A score is 20. How many years old is a man who is 3 score and 10 years old ?

4. A gross is 12 dozen. How many pens in a gross of pens ?

5. There are 24 sheets of paper in a quire and 20 quires in a ream. How many quires are there in a ream of paper ?

6. How many square rods in a house-lot 8 rods front and 12 rods deep ?

7. If a lot has 10 rods front, what must be its depth in order to contain an acre ?

8. If a box must have 5 cubic feet of space in order to hold 4 bushels of oats, how many bushels will a box hold that has 40 cubic feet of space ?

9. How many quarts in 10 gallons and 3 quarts ?

10. From a firkin of butter containing 27 pounds 8 ounces, 7 pounds and 4 ounces are sold. How much is left in the firkin ?

11. From a bushel of beans 4 quarts are sold. How many 4-quart measures can be filled from the beans that are left ?

12. How many cubic feet in a box that measures inside 3 feet long, 3 feet wide, and 3 feet high ? How many cubic yards ?

13. How many cords of wood in a pile 16 feet long, 4 feet wide, and 4 feet high ?

CHAPTER III.

Lesson 1.
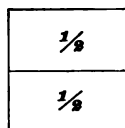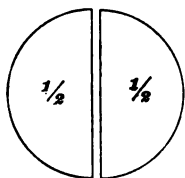
1. Into how many equal parts is the apple divided?

2. What is the name of each part?

3. The name, one-half, tells that the whole apple is divided into how many equal parts?

4. How many halves of an apple make 1 apple?

5. If the square contains 10 sq. ft., how many square feet are there in one-half of it?

6. If a man walks 4 miles in an hour, how far will he walk in one-half of an hour?

7. How many cents are there in one-half of a dollar?

8. How many inches are there in one-half of a foot? one-half of 2 feet? one-half of 6 feet?

9. How many ounces are there in one-half of a pound? one-half of 4 pounds?

10. How many halves can be made from 1 cake? 3 cakes? 7 cakes? 11 cakes?

11. How do we express one-half with figures?

1. What part of a quart is one pint?

2. How many quarts are there in 4 pints? 12 pints? 20 pints? 24 pints?

3. How many dollars are there in 2 half-dollars? 6 half-dollars? 10 half-dollars? 18 half-dollars?

4. If 18 pears are divided equally between two boys, what part of 18 pears will each boy receive?

5. If one-half of a pound of copper costs 6 cents, what is the cost of a pound?

6. Six is $\frac{1}{2}$ of what number?

7. James has 7 dollars and John has 12 half-dollars. How much more has James than John?

8. By what number must 8 be divided to get $\frac{1}{2}$ of 8?

9. What is $\frac{1}{2}$ of 14? 18? 26? 80? 100?

10. If a ten-quart pail is half full of water, how many quarts of water are in the pail?

11. If you have five apples of the same size, how can you divide them equally between two boys?

12. How many quarts are there in one-half of a bushel? How many quarts in $\frac{1}{2}$ of a half-bushel?

13. How many half-dollars make 2 dollars? $2\frac{1}{2}$ dollars? $3\frac{1}{2}$ dollars? $4\frac{1}{2}$ dollars?

Solution: One dollar is equal to 2 half-dollars. Therefore 2 dollars are equal to 2 × 2 half-dollars, or 4 half-dollars; and $2\frac{1}{2}$ dollars are equal to 4 half-dollars and 1 half-dollar, or 5 half-dollars.

14. How many half-bushel measures will $2\frac{1}{2}$ bushels of wheat fill? will $5\frac{1}{2}$ bushels fill?

15. If oats are put up in bags of $2\frac{1}{2}$ bushels in a bag, how many bushels will there be in 2 bags?

Lesson 3.
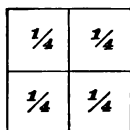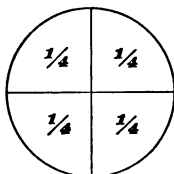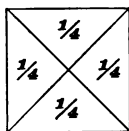
1. Into how many equal parts is the circle divided?

2. What is the name of each part?

3. The name, one-fourth, or one-quarter, tells that the whole circle is divided into how many equal parts? How many fourths in the whole circle?

4. How many quarters are there in 1 dollar?

5. If a square contains 16 sq. ft., how many square feet are there in one-fourth of it? in two-fourths?

6. How many marbles are there in one-fourth of 8 marbles? 12 marbles? 20 marbles? 32 marbles? 36 marbles? 40 marbles?

7. How many gills are there in one-fourth of a pint? in one-fourth of a quart? one-fourth of 4 quarts?

8. How many ounces are there in one-quarter of a pound? in two-quarters of a pound? in three-quarters? in four-quarters? in one pound and a quarter?

9. How many eggs are there in one-fourth of a dozen of eggs? in two-fourths? in one-half? in three-fourths? in one dozen and a quarter?

10. How do we express one-fourth, or one-quarter, with figures? two-fourths? three-fourths?

11. How many more eggs in $\frac{1}{2}$ of a dozen than in $\frac{1}{4}$ of a dozen? How many fourths make one-half?

Lesson 4.

1. How many quarters of an apple are there in one-half of an apple ? in two halves of an apple ?

2. How many halves of an apple are there in two-fourths of an apple ? in four-fourths ?

3. What part of a bushel is 1 peck ? 2 pecks ? 3 pecks ? 4 pecks ?

4. How many quarters of an apple can be made from 1 apple ? 3 apples ? 5 apples ? 12 apples ?

5. If four men hire a carriage and the charge is $8, what part of $8 should each man pay to divide the expense equally ?

6. If boards cost $20 a thousand feet, what is the cost of $\frac{1}{4}$ of a thousand feet ? of $\frac{3}{4}$ of a thousand feet ?

7. By what number do we divide 20 to find one-fourth of 20 ?

8. What is $\frac{1}{4}$ of 16 ? 24 ? 40 ? 48 ? 100 ?

9. What is $\frac{1}{4}$ of $8 ? $\frac{1}{4}$ of $4 ? $\frac{1}{4}$ of $2 ?

10. $2 is $\frac{1}{4}$ of what ? $1 is $\frac{1}{4}$ of what ?

11. How many quarters of a dollar are there in $1 ? in $2 ? in $2\frac{1}{4}$? in $2\frac{1}{2}$? in $3\frac{1}{4}$?

12. How many bushels of oats will there be in 2 bags if each bag contains $2\frac{1}{4}$ bushels ? How many bushels will there be in 4 bags ?

13. How many fourths are there in $\frac{1}{2}$ and $\frac{1}{4}$ together ?

14. If from a pile of quarters of a dollar you take 3 quarters each time for 4 times, how many dollars will you have ?

15. How many whole ones in 4 times $\frac{1}{4}$? in 4 times $\frac{3}{4}$? in 4 times $\frac{2}{4}$? in 4 times $\frac{1}{2}$?

Lesson 5.

1. Into how many equal parts is the pineapple divided ?

2. What is the name of each part ?

3. The name, one-third, shows that the whole is divided into how many equal parts ?

4. How many thirds of the circle in the whole circle ?

5. If the rectangle contains 15 sq. ft., how many square feet are there in one-third of it? in two-thirds ? in three-thirds ?

6. If 12 boys are arranged in 3 groups so that there is the same number of boys in each group, what part of the whole number of boys is in each group? How many boys are there in each group? What part of 12 is 4 ?

7. How many feet are there in one-third of a yard ? two-thirds of a yard? one-third of 2 yards ?

8. How do we express one-third with figures ? two-thirds ? three-thirds ?

9. How many oranges will be required to give each of 12 boys $\frac{1}{3}$ of an orange? $\frac{1}{2}$ of an orange? $\frac{1}{4}$ of an orange?

10. Which is greater, $\frac{1}{3}$ of an orange or $\frac{1}{2}$ of an orange ? $\frac{1}{3}$ of an orange or $\frac{1}{4}$ of an orange?

1. If 2 apples are divided equally among 3 boys, what part of an apple will each boy receive?

Hint. Each apple must be divided into 3 equal parts, and each boy will have 2 of these parts, or ⅔ of 1 apple.

2. If ½ of a barrel of flour costs $2, what is the cost of a barrel of flour?

3. 2 is ⅓ of what number? 3 is ⅕ of what number?

4. If ⅔ of a ton of hay cost $12, what is the cost of ⅓ of a ton? what is the cost of a ton?

5. How many square feet are there in ⅓ of a square yard? in ⅔ of a square yard?

6. What part of a yard is 1 foot? 2 feet?

7. How many yards are there in 6 ft.? in 9 ft.? in 24 ft.? in 27 feet? in 30 feet?

8. How many inches are there in ½ of a foot? in ⅓ of a yard? in ⅔ of a foot? in ⅔ of a yard?

9. By what number do you divide 12 to find ⅓ of 12? What is ⅓ of 15? 21? 30? 36? 63? 90?

10. If Frank has lost ⅓ of his money, how many thirds has he left? If he had $12 at first, how many dollars did he lose? how many dollars has he left?

11. How many more oranges are there in ½ of a dozen than in ⅓ of a dozen? in ⅓ of a dozen than in ¼ of a dozen? in ⅕ of a dozen than in ¼ of a dozen?

12. How many minutes are there in 1 hour and ⅓ of an hour? in 1 hour and ⅔ of an hour?

13. If you take ⅓ of the pine-apple, how many thirds will be left? if you take ⅔, how many thirds will be left? What then is 1 − ⅓? 1 − ⅔?

Lesson 7.
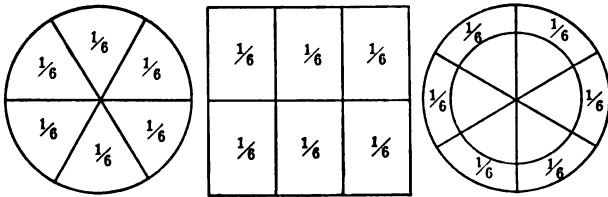
1. Into how many equal parts is the circle divided?

2. What is the name of each part?

3. How many sixths of the circle make the whole circle?

4. If the square contains 18 sq. ft., how many square feet are there in one-sixth of it? in three-sixths? in five-sixths?

5. How do we express one-sixth in figures? five-sixths? three-sixths?

6. If 12 books are divided equally among 6 boys, what part of the 12 books will each boy receive?

7. How many months are there in $\frac{1}{2}$ of a year, in $\frac{1}{3}$ of a year? in $\frac{1}{6}$ of a year? in $\frac{1}{4}$ of a year?

8. How many sixths of a year in $\frac{1}{2}$ of a year? in $\frac{1}{3}$ of a year? in $\frac{2}{3}$ of a year?

9. If Frank received $\frac{1}{2}$ of 18 marbles and Charles $\frac{1}{3}$ of 18 marbles, how many marbles did both receive?

10. If Henry has $\frac{1}{6}$ of 30 peaches and John has $\frac{1}{3}$ of 30 peaches, how many peaches have both?

11. One-half of 30 is equal to how many sixths of 30? $\frac{1}{3}$ of 30 is equal to how many sixths of 30?

12. What part of anything is 2 times $\frac{1}{6}$ of it? 3 times $\frac{1}{6}$ of it? 4 times $\frac{1}{6}$ of it?

Lesson 8.

1. How many inches are there in $\frac{1}{4}$ of a foot? in $\frac{2}{3}$ of a foot? in $\frac{1}{6}$ of a foot? in $\frac{3}{4}$ of a foot? in $\frac{1}{2}$ of a foot? in $\frac{4}{6}$ of a foot? in $\frac{2}{3}$ of a foot?

2. How many minutes are there in $\frac{1}{6}$ of an hour? in $\frac{1}{3}$ of an hour? in $\frac{4}{6}$ of an hour? in $\frac{2}{3}$ of an hour?

3. Four-sixths of an hour is equal to how many thirds of an hour?

4. If a man works six days each week, what part of a week's wages will he earn in 1 day? in 2 days? in 3 days? in 5 days? in 4 days?

5. If four pies are divided equally among some boys so that each boy receives $\frac{1}{4}$ of a pie, how many boys are there?

6. By what number do you divide 12 to get $\frac{1}{6}$ of 12?

7. What is $\frac{1}{6}$ of 18? 24? 30? 42? 54? 60?

8. 8 is $\frac{1}{6}$ of what number? 9 is $\frac{1}{6}$ of what number?

9. How many square feet are there in $\frac{1}{6}$ of a mat 9 feet long and 4 feet wide?

10. How many square inches are there in $\frac{4}{6}$ of a board 12 inches long and 3 inches wide?

11. If $\frac{1}{6}$ of a pound of rice costs 2 cents, what is the cost of 1 pound? of 6 pounds?

12. If you divide $\frac{1}{3}$ of an apple into 2 equal parts, what part of the whole apple will each of these two parts be? What then is $\frac{1}{2}$ of $\frac{1}{3}$? $\frac{1}{2} \times \frac{1}{3}$?

13. If you divide $\frac{1}{2}$ of an apple into 3 equal parts, what part of the whole apple will each of these parts be? What then is $\frac{1}{3}$ of $\frac{1}{2}$? $\frac{1}{3} \times \frac{1}{2}$?

14. How many sixths in $\frac{1}{2}$? in $\frac{1}{3}$? in $\frac{1}{2}+\frac{1}{3}$? in $\frac{1}{2}-\frac{1}{3}$? in $2 \times \frac{1}{2}$? in $2 \times \frac{1}{3}$?
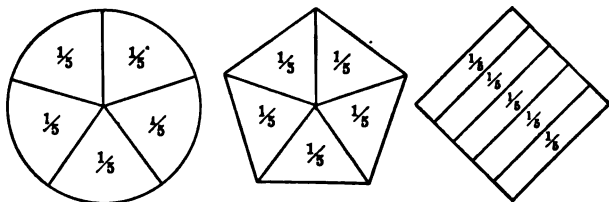
1. Into how many equal parts is the circle divided?

2. What is the name of each part?

3. How many fifths of the circle in the circle?

4. If a square contains 10 sq. ft., how many square feet are there in one-fifth of it? in three-fifths?

5. If a pie is divided equally among 5 boys, what part of a pie will each boy receive?

6. What will be the share of each boy if 3 cakes are divided equally among 5 boys?

7. How do we express one-fifth with figures? two-fifths? three-fifths? four-fifths? five-fifths?

8. If Frank had 15 pears and gave away ⅕ of them, how many pears did he give away? How many fifths had he left? How many pears had he left?

9. A farmer had 10 bushels of wheat. He sold ⅕ of his wheat to one man and ⅖ of his wheat to another man. How many bushels did he sell?

10. If it costs $7 to dig ⅕ of a ditch, what will it cost to dig the whole ditch?

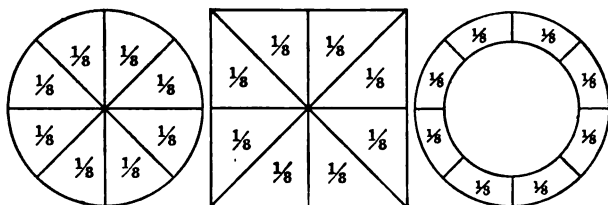**11.** 7 is ⅕ of what number? 9 is ⅕ of what number? 11 is ⅕ of what number?

Lesson 10.

1. If 2 pounds of copper can be bought for $\frac{1}{4}$ of a dollar, how many pounds can be bought for a dollar ?

2. By what number do you divide 30 to get $\frac{1}{5}$ of 30 ?

3. What is $\frac{1}{5}$ of 25 ? 35 ? 50 ? 75 ? 100 ?

4. What is the sum of $\frac{1}{4}$ of 20 and $\frac{1}{5}$ of 20 ?

5. Thomas had 30 marbles. If he lost $\frac{1}{5}$ of them and gave away $\frac{2}{5}$ of them, how many fifths had he left ? How many marbles had he left ?

6. What is the difference between $\frac{1}{3}$ of 30 and $\frac{1}{5}$ of 30 ? $\frac{1}{2}$ of 30 and $\frac{1}{5}$ of 30 ?

7. 8 is $\frac{2}{5}$ of what number ?

Solution : If 8 is $\frac{2}{5}$ of a number, $\frac{1}{5}$ of the number will be $\frac{1}{2}$ of 8, or 4. If 4 is $\frac{1}{5}$ of the number, $\frac{5}{5}$ of the number will be 5 times 4, or 20. But $\frac{5}{5}$ of a number is the number itself, therefore, 8 is $\frac{2}{5}$ of 20.

8. 12 is $\frac{2}{5}$ of what number ? 12 is $\frac{3}{5}$ of what number ? 12 is $\frac{4}{5}$ of what number ? .

9. If you have 25 cents and spend $\frac{2}{5}$ of your money, how much money will you have left ?

10. If you spend $\frac{2}{5}$ of your money, how many fifths will you have left ?

11. What is $\frac{2}{5}$ of 25 ? $\frac{3}{5}$ of 25 ? $\frac{4}{5}$ of 25 ?

12. 24 is $\frac{2}{5}$ of what number ? 24 is $\frac{3}{5}$ of what number ? 24 is $\frac{4}{5}$ of what number ?

13. How many fifths are $\frac{2}{5}+\frac{1}{5}$? $\frac{2}{5}+\frac{2}{5}$? $\frac{2}{5}+\frac{3}{5}$? $\frac{2}{5}-\frac{1}{5}$? $\frac{3}{5}-\frac{2}{5}$? $\frac{4}{5}-\frac{2}{5}$? $2\times\frac{1}{5}$? $2\times\frac{2}{5}$? $4\times\frac{1}{5}$? $\frac{1}{2}$ of $\frac{2}{5}$? $\frac{1}{2}$ of $\frac{4}{5}$? $\frac{1}{4}$ of $\frac{4}{5}$?

14. How many fifths in 2 ? in $2\frac{3}{5}$? in $3\frac{2}{5}$? in $4\frac{1}{5}$? in $6\frac{2}{5}$? in $8\frac{3}{5}$?

Lesson 11.

1. Into how many equal parts is the circle divided?

2. What is the name of each part?

3. How many eighths of the circle in the circle?

4. If a square contains 24 sq. ft., how many square feet are there in one-eighth of it? three-eighths? four-eighths? seven-eighths? eight-eighths?

5. How many ounces in one-eighth of a pound? in two-eighths of a pound? in ¼ of a pound?

6. One-fourth is equal to how many eighths?

7. How many quarts are there in one-eighth of a peck? in four-eighths of a peck? in ½ of a peck?

8. One-half is equal to how many eighths?

9. How do we express one-eighth with figures? three-eighths? five-eighths? seven-eighths?

10. A gill is what part of a pint? of a quart?

11. How many gills are there in ⅝ of a quart?

12. If one-fourth of a pound of oil is mixed with ⅛ of a pound of turpentine, how many ounces will the mixture weigh?

13. If Mary found 2 dozen eggs and broke ⅛ of them, how many eighths had she left? How many eggs did she break? How many eggs had she left?

Lesson 12.

1. If Charles can hoe $\frac{3}{8}$ of a field in a day and Joseph can hoe $\frac{1}{8}$, how many eighths can both hoe in a day? in 2 days? How many days will it take them to hoe the field?

2. How many quarts are there in $\frac{1}{8}$ of a bushel?

3. By what number do you divide 32 to find $\frac{1}{8}$ of 32?

4. What is $\frac{1}{8}$ of 24? 40? 56? 72? 80?

5. If it costs $20 to build $\frac{5}{8}$ of a wall, what will it cost to build $\frac{1}{8}$ of it? to build the whole wall?

6. 20 is $\frac{5}{8}$ of what number?

7. How many eighths in $\frac{1}{2}$? in $\frac{1}{4}$? in $\frac{3}{4}$?

8. How many eighths in $\frac{1}{2}$ and $\frac{1}{8}$? in $\frac{1}{4}$ and $\frac{1}{8}$? in $\frac{1}{2}$ and $\frac{1}{4}$ and $\frac{1}{8}$? in $\frac{1}{2}$ and $\frac{3}{8}$? in $\frac{1}{4}$ and $\frac{5}{8}$?

9. If you have $\frac{1}{2}$ of a bushel of cranberries and sell $\frac{1}{4}$ of them, what part of a bushel have you left?

10. How much is $\frac{1}{2}$ of $\frac{1}{4}$? $\frac{1}{4}$ of $\frac{1}{2}$?

11. How many eighths in 1? in $1\frac{1}{8}$? in $2\frac{5}{8}$?

12. How many ounces in $\frac{1}{8}$ of a pound? in $\frac{3}{8}$ of a pound? in $\frac{5}{8}$ of a pound? in $1\frac{5}{8}$ pounds?

13. How many quarts in $\frac{1}{8}$ of a bushel? in $\frac{3}{8}$ of a bushel? in $\frac{5}{8}$ of a bushel? in $\frac{7}{8}$ of a bushel?
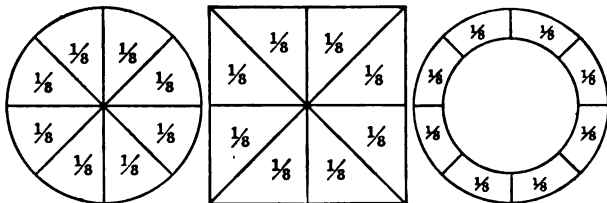
14. Since 1 is equal to $\frac{8}{8}$, how much is $1-\frac{3}{8}$? $1-\frac{5}{8}$? $1-\frac{1}{8}$? $1-\frac{7}{8}$?

15. James had 40 chickens. He lost $\frac{3}{8}$ of them; how many had he left?

16. How many eighths are $2\times\frac{1}{8}$? $2\times\frac{3}{8}$? $\frac{1}{2}$ of $\frac{2}{8}$? $\frac{1}{2}$ of $\frac{4}{8}$? $\frac{1}{2}$ of $\frac{6}{8}$? $\frac{1}{4}$ of $\frac{6}{8}$? $\frac{1}{4}$ of $\frac{4}{8}$?

17. After spending 50 cents I have $\frac{3}{8}$ of my money left. How many cents had I at first?

Lesson 11.

1. Into how many equal parts is the circle divided?

2. What is the name of each part?

3. How many eighths of the circle in the circle?

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Lesson 12.

1. If Charles can hoe ⅜ of a field in a day and Joseph can hoe ⅛, how many eighths can both hoe in a day? in 2 days? How many days will it take them to hoe the field?

2. How many quarts are there in ⅛ of a bushel?

3. By what number do you divide 32 to find ⅛ of 32?

4. What is ⅛ of 24? 40? 56? 72? 80?

5. If it costs $20 to build ⅝ of a wall, what will it cost to build ⅛ of it? to build the whole wall?

6. 20 is ⅝ of what number?

7. How many eighths in ½? in ¼? in ¾?

8. How many eighths in ½ and ⅛? in ¼ and ⅛? in ½ and ¼ and ⅛? in ½ and ⅜? in ¼ and ⅝?

9. If you have ½ of a bushel of cranberries and sell ¼ of them, what part of a bushel have you left?

10. How much is ½ of ¼? ¼ of ½?

11. How many eighths in 1? in 1⅛? in 2⅝?

12. How many ounces in ⅛ of a pound? in ⅜ of a pound? in ⅝ of a pound? in 1⅝ pounds?

13. How many quarts in ⅛ of a bushel? in ⅜ of a bushel? in ⅝ of a bushel? in ⅞ of a bushel?

14. Since 1 is equal to ⅝, how much is 1 — ⅜? 1 — ⅝? 1 — ⅛? 1 — ⅞?

15. James had 40 chickens. He lost ⅝ of them; how many had he left?

16. How many eighths are 2 × ⅛? 2 × ⅜? ½ of ⅜? ½ of ¼? ½ of ⅝? ¼ of ⅝? ¼ of ⅜?

17. After spending 50 cents I have ⅝ of my money left. How many cents had I at first?

Lesson 11.

1. Into how many equal parts is the circle divided?

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Lesson 12.

1. If Charles can hoe $\frac{5}{8}$ of a field in a day and Joseph can hoe $\frac{1}{8}$, how many eighths can both hoe in a day? in 2 days? How many days will it take them to hoe the field?

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8. How many eighths in $\frac{1}{2}$ and $\frac{1}{8}$? in $\frac{1}{4}$ and $\frac{1}{8}$? in $\frac{1}{2}$ and $\frac{1}{4}$ and $\frac{1}{8}$? in $\frac{1}{2}$ and $\frac{3}{8}$? in $\frac{1}{4}$ and $\frac{5}{8}$?

9. If you have $\frac{1}{2}$ of a bushel of cranberries and sell $\frac{1}{4}$ of them, what part of a bushel have you left?

10. How much is $\frac{1}{2}$ of $\frac{1}{4}$? $\frac{1}{4}$ of $\frac{1}{2}$?

11. How many eighths in 1? in $1\frac{1}{8}$? in $2\frac{5}{8}$?

12. How many ounces in $\frac{1}{8}$ of a pound? in $\frac{5}{8}$ of a pound? in $\frac{5}{8}$ of a pound? in $1\frac{5}{8}$ pounds?

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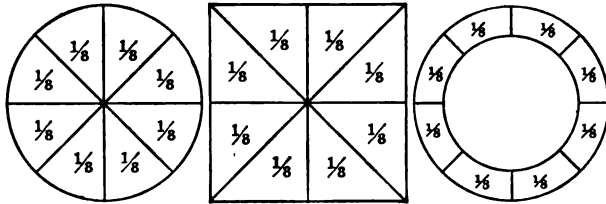
14. Since 1 is equal to $\frac{8}{8}$, how much is $1-\frac{3}{8}$? $1-\frac{5}{8}$? $1-\frac{1}{8}$? $1-\frac{7}{8}$?

15. James had 40 chickens. He lost $\frac{5}{8}$ of them; how many had he left?

16. How many eighths are $2\times\frac{1}{8}$? $2\times\frac{3}{8}$? $\frac{1}{2}$ of $\frac{3}{4}$? $\frac{1}{2}$ of $\frac{3}{4}$? $\frac{1}{2}$ of $\frac{5}{8}$? $\frac{1}{4}$ of $\frac{5}{8}$? $\frac{1}{4}$ of $\frac{3}{4}$?

17. After spending 50 cents I have $\frac{5}{8}$ of my money left. How many cents had I at first?

Lesson 11.

1. Into how many equal parts is the circle divided?

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3. How many eighths of the circle in the circle?

4. If a square contains 24 sq. ft., how many square feet are there in one-eighth of it? three-eighths? four-eighths? seven-eighths? eight-eighths?

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1. If Charles can hoe ⅜ of a field in a day and Joseph can hoe ⅛, how many eighths can both hoe in a day? in 2 days? How many days will it take them to hoe the field?

2. How many quarts are there in ⅛ of a bushel?

3. By what number do you divide 32 to find ⅛ of 32?

4. What is ⅛ of 24? 40? 56? 72? 80?

5. If it costs $20 to build ⅝ of a wall, what will it cost to build ⅛ of it? to build the whole wall?

6. 20 is ⅝ of what number?

7. How many eighths in ½? in ¼? in ¾?

8. How many eighths in ½ and ⅛? in ¼ and ⅛? in ½ and ¼ and ⅛? in ½ and ⅜? in ¼ and ⅝?

9. If you have ½ of a bushel of cranberries and sell ¼ of them, what part of a bushel have you left?

10. How much is ½ of ¼? ¼ of ½?

11. How many eighths in 1? in 1⅛? in 2⅝?

12. How many ounces in ⅛ of a pound? in ⅜ of a pound? in ⅝ of a pound? in 1⅝ pounds?

13. How many quarts in ⅛ of a bushel? in ⅜ of a bushel? in ⅝ of a bushel? in ⅞ of a bushel?

14. Since 1 is equal to ⅝, how much is 1 — ⅜? 1 — ⅝? 1 — ⅛? 1 — ⅞?

15. James had 40 chickens. He lost ⅝ of them; how many had he left?

16. How many eighths are 2 × ⅛? 2 × ⅜? ½ of ⅜? ½ of ¾? ½ of ⅝? ¼ of ⅝? ¼ of ⅞?

17. After spending 50 cents I have ⅝ of my money left. How many cents had I at first?

Lesson 11.

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5. How many ounces in one-eighth of a pound? in two-eighths of a pound? in ¼ of a pound?

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Lesson 12.

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2. How many quarts are there in ⅛ of a bushel?

3. By what number do you divide 32 to find ⅛ of 32?

4. What is ⅛ of 24? 40? 56? 72? 80?

5. If it costs $20 to build ⅝ of a wall, what will it cost to build ⅛ of it? to build the whole wall?

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13. How many quarts in ⅛ of a bushel? in ⅜ of a bushel? in ⅝ of a bushel? in ⅞ of a bushel?

14. Since 1 is equal to ⅝, how much is 1 − ⅜? 1 − ⅝? 1 − ⅛? 1 − ⅞?

15. James had 40 chickens. He lost ⅝ of them; how many had he left?

16. How many eighths are 2 × ⅛? 2 × ⅜? ½ of ⅜? ½ of ¼? ½ of ⅝? ¼ of ⅝? ¼ of ⅜?

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1. Into how many equal parts is the circle divided?

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5. How many ounces in one-eighth of a pound? in two-eighths of a pound? in $\frac{1}{4}$ of a pound?

6. One-fourth is equal to how many eighths?

7. How many quarts are there in one-eighth of a peck? in four-eighths of a peck? in $\frac{1}{2}$ of a peck?

8. One-half is equal to how many eighths?

9. How do we express one-eighth with figures? three-eighths? five-eighths? seven-eighths?

10. A gill is what part of a pint? of a quart?

11. How many gills are there in $\frac{5}{8}$ of a quart?

12. If one-fourth of a pound of oil is mixed with $\frac{1}{8}$ of a pound of turpentine, how many ounces will the mixture weigh?

13. If Mary found 2 dozen eggs and broke $\frac{1}{8}$ of them, how many eighths had she left? How many eggs did she break? How many eggs had she left?

Lesson 12.

1. If Charles can hoe $\frac{5}{8}$ of a field in a day and Joseph can hoe $\frac{1}{8}$, how many eighths can both hoe in a day? in 2 days? How many days will it take them to hoe the field?

2. How many quarts are there in $\frac{1}{8}$ of a bushel?

3. By what number do you divide 32 to find $\frac{1}{8}$ of 32?

4. What is $\frac{1}{8}$ of 24? 40? 56? 72? 80?

5. If it costs \$20 to build $\frac{5}{8}$ of a wall, what will it cost to build $\frac{1}{8}$ of it? to build the whole wall?

6. 20 is $\frac{5}{8}$ of what number?

7. How many eighths in $\frac{1}{2}$? in $\frac{1}{4}$? in $\frac{3}{4}$?

8. How many eighths in $\frac{1}{2}$ and $\frac{1}{8}$? in $\frac{1}{4}$ and $\frac{1}{8}$? in $\frac{1}{2}$ and $\frac{1}{4}$ and $\frac{1}{8}$? in $\frac{1}{2}$ and $\frac{3}{8}$? in $\frac{1}{4}$ and $\frac{5}{8}$?

9. If you have $\frac{1}{2}$ of a bushel of cranberries and sell $\frac{1}{4}$ of them, what part of a bushel have you left?

10. How much is $\frac{1}{2}$ of $\frac{1}{4}$? $\frac{1}{4}$ of $\frac{1}{2}$?

11. How many eighths in 1? in $1\frac{1}{2}$? in $2\frac{5}{8}$?

12. How many ounces in $\frac{1}{8}$ of a pound? in $\frac{5}{8}$ of a pound? in $\frac{5}{8}$ of a pound? in $1\frac{5}{8}$ pounds?

13. How many quarts in $\frac{1}{8}$ of a bushel? in $\frac{5}{8}$ of a bushel? in $\frac{3}{8}$ of a bushel? in $\frac{7}{8}$ of a bushel?

14. Since 1 is equal to $\frac{8}{8}$, how much is $1-\frac{5}{8}$? $1-\frac{3}{8}$? $1-\frac{1}{8}$? $1-\frac{7}{8}$?

15. James had 40 chickens. He lost $\frac{5}{8}$ of them; how many had he left?

16. How many eighths are $2\times\frac{1}{8}$? $2\times\frac{5}{8}$? $\frac{1}{2}$ of $\frac{3}{4}$? $\frac{1}{2}$ of $\frac{3}{4}$? $\frac{1}{2}$ of $\frac{5}{8}$? $\frac{1}{4}$ of $\frac{5}{8}$? $\frac{1}{4}$ of $\frac{3}{4}$?

17. After spending 50 cents I have $\frac{5}{8}$ of my money left. How many cents had I at first?

Lesson 11.

1. Into how many equal parts is the circle divided?

2. What is the name of each part?

3. How many eighths of the circle in the circle?

4. If a square contains 24 sq. ft., how many square feet are there in one-eighth of it? three-eighths? four-eighths? seven-eighths? eight-eighths?

5. How many ounces in one-eighth of a pound? in two-eighths of a pound? in $\frac{1}{4}$ of a pound?

6. One-fourth is equal to how many eighths?

7. How many quarts are there in one-eighth of a peck? in four-eighths of a peck? in $\frac{1}{2}$ of a peck?

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13. If Mary found 2 dozen eggs and broke $\frac{1}{8}$ of them, how many eighths had she left? How many eggs did she break? How many eggs had she left?

Lesson 12.

1. If Charles can hoe $\frac{3}{8}$ of a field in a day and Joseph can hoe $\frac{1}{4}$, how many eighths can both hoe in a day? in 2 days? How many days will it take them to hoe the field?

2. How many quarts are there in $\frac{1}{8}$ of a bushel?

3. By what number do you divide 32 to find $\frac{1}{8}$ of 32?

4. What is $\frac{1}{8}$ of 24? 40? 56? 72? 80?

5. If it costs $20 to build $\frac{5}{8}$ of a wall, what will it cost to build $\frac{1}{8}$ of it? to build the whole wall?

6. 20 is $\frac{5}{8}$ of what number?

7. How many eighths in $\frac{1}{2}$? in $\frac{1}{4}$? in $\frac{3}{4}$?

8. How many eighths in $\frac{1}{2}$ and $\frac{1}{8}$? in $\frac{1}{4}$ and $\frac{1}{8}$? in $\frac{1}{2}$ and $\frac{1}{4}$ and $\frac{1}{8}$? in $\frac{1}{2}$ and $\frac{3}{8}$? in $\frac{1}{4}$ and $\frac{5}{8}$?

9. If you have $\frac{1}{2}$ of a bushel of cranberries and sell $\frac{1}{4}$ of them, what part of a bushel have you left?

10. How much is $\frac{1}{2}$ of $\frac{1}{4}$? $\frac{1}{4}$ of $\frac{1}{2}$?

11. How many eighths in 1? in $1\frac{1}{4}$? in $2\frac{5}{8}$?

12. How many ounces in $\frac{1}{8}$ of a pound? in $\frac{3}{8}$ of a pound? in $\frac{5}{8}$ of a pound? in $1\frac{5}{8}$ pounds?

13. How many quarts in $\frac{1}{8}$ of a bushel? in $\frac{3}{8}$ of a bushel? in $\frac{5}{8}$ of a bushel? in $\frac{7}{8}$ of a bushel?

14. Since 1 is equal to $\frac{8}{8}$, how much is $1-\frac{3}{8}$? $1-\frac{5}{8}$? $1-\frac{1}{8}$? $1-\frac{7}{8}$?

15. James had 40 chickens. He lost $\frac{3}{8}$ of them; how many had he left?

16. How many eighths are $2 \times \frac{1}{8}$? $2 \times \frac{3}{8}$? $\frac{1}{2}$ of $\frac{3}{8}$? $\frac{1}{2}$ of $\frac{7}{8}$? $\frac{1}{2}$ of $\frac{5}{8}$? $\frac{1}{4}$ of $\frac{5}{8}$? $\frac{1}{4}$ of $\frac{3}{8}$?

17. After spending 50 cents I have $\frac{5}{8}$ of my money left. How many cents had I at first?

Lesson 13.

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

1. Into how many equal parts is the rectangle divided ?

2. What is the name of each part ?

3. How many tenths of the rectangle make the whole rectangle ?

4. If the rectangle contains 40 sq. ft., how many square feet are there in one-tenth of it ? two-tenths ? three-tenths ? five-tenths ? seven-tenths ?

5. How do we express one-tenth with figures ? three-tenths ? seven-tenths ? nine-tenths ?

6. How many cents are there in $\frac{1}{10}$ of a dollar ?

7. Four ten-cent pieces make how many tenths of a dollar ? seven ten-cent pieces ?

8. How many hundredweight are there in $\frac{1}{10}$ of a ton ? $\frac{2}{10}$ of a ton ? $\frac{1}{4}$ of a ton ?

9. One-fifth of a ton is equal to how many tenths of a ton ? Two-fifths is equal to how many tenths ?

10. How many minutes are there in $\frac{1}{10}$ of an hour ? $\frac{5}{10}$ of an hour ? $\frac{1}{2}$ of an hour ? $\frac{1}{4}$ of an hour ?

11. One-half of an hour is equal to how many tenths of an hour ?

12. If a yard of silk costs $1, what will a yard cost if $\frac{1}{10}$ of the price is taken off ?

Lesson 14.

1. If 3 cakes are cut into tenths, how many boys can be supplied with $\frac{1}{10}$ of a cake?

2. If a man gives away $\frac{3}{10}$ of a basket of peaches and sells $\frac{5}{10}$, how many tenths are left?

3. Thomas was given a half-dollar to spend. If he spent $\frac{1}{2}$ of it for cherries and $\frac{1}{10}$ of it for a pencil, how many tenths did he spend? How many cents did he spend? How many cents had he left?

4. If it costs $15 to paint $\frac{3}{10}$ of a house, what is the cost of painting $\frac{1}{10}$ of the house? How much will it cost to paint the house?

5. 15 is $\frac{3}{10}$ of what number?

6. What is $\frac{1}{10}$ of 40? 50? 70? 90? 100?

7. 4 is $\frac{1}{10}$ of what number? 4 is $\frac{2}{10}$ of what number? 4 is $\frac{4}{10}$ of what number?

8. 6 is $\frac{3}{10}$ of what number? 8 is $\frac{4}{10}$ of what number? 10 is $\frac{5}{10}$ of what number?

9. 30 is $\frac{5}{10}$ of what number? 30 is $\frac{6}{10}$ of what number? 30 is $\frac{3}{10}$ of what number?

10. 56 is $\frac{7}{10}$ of what number? 56 is $\frac{8}{10}$ of what number? 54 is $\frac{6}{10}$ of what number?

11. What is $\frac{1}{2}$ of $\frac{1}{5}$? $\frac{1}{5}$ of $\frac{1}{2}$? $\frac{1}{2}$ of $\frac{2}{10}$? $\frac{1}{2}$ of $\frac{6}{10}$? $\frac{1}{6}$ of $\frac{6}{10}$?

12. What part of 10 is 1? 2? 3? 7? 9?

13. How many tenths in $\frac{1}{2} + \frac{1}{10}$? in $\frac{1}{5} + \frac{1}{10}$? in $\frac{1}{2} - \frac{1}{10}$? in $\frac{1}{5} - \frac{1}{10}$? in $2 \times \frac{1}{10}$? in $2 \times \frac{3}{10}$? in $2 \times \frac{4}{10}$? in $3 \times \frac{3}{10}$? in $\frac{1}{2}$ of $\frac{2}{10}$? in $\frac{1}{2}$ of $\frac{6}{10}$? in $\frac{1}{2}$ of $\frac{8}{10}$?

14. How many times is $\frac{1}{10}$ contained in $\frac{2}{10}$? in $\frac{3}{10}$? in $\frac{7}{10}$? in $\frac{8}{10}$? in $\frac{9}{10}$?

15. How many more rods are there in $\frac{1}{8}$ of a mile than in $\frac{1}{10}$ of a mile? Which is greater, then, $\frac{1}{10}$ or $\frac{1}{8}$?

Lesson 15.
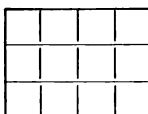
1. Into how many equal parts is the rectangle divided?

2. What is the name of each part?

3. The name, one-twelfth, tells that the whole rectangle is divided into how many equal parts?

4. How many twelfths of the rectangle make the whole rectangle?

5. If the rectangle contains 48 sq. ft., how many square feet are there in one-twelfth of it? five-twelfths? six-twelfths? nine-twelfths?

6. How do we express one-twelfth with figures? five-twelfths? seven-twelfths?

7. How many inches are there in $\frac{1}{12}$ of a foot? in $\frac{1}{2}$ of a foot? in $\frac{6}{12}$ of a foot? in $\frac{1}{6}$ of a foot? in $\frac{4}{12}$ of a foot? in $\frac{1}{4}$ of a foot? in $\frac{3}{12}$ of a foot?

8. One-half of a foot is equal to how many twelfths of a foot? how many sixths of a foot? how many fourths of a foot?

9. How many buttons are there in $\frac{1}{12}$ of 2 dozen buttons? $\frac{1}{3}$ of 2 dozen? $\frac{1}{4}$ of 2 dozen? $\frac{1}{6}$ of 2 dozen?

10. One-third of 2 dozen is equal to how many twelfths of 2 dozen? how many sixths of 2 dozen?

11. If twelve pence make a shilling, how many pence are there in $\frac{1}{12}$ of a shilling? $\frac{1}{4}$ of a shilling?

12. One-fourth of a shilling is equal to how many twelfths of a shilling?

Lesson 16.

1. One-sixth of a dozen is equal to how many twelfths of a dozen?

2. How many months are there in $\frac{1}{2}$ of a year? $\frac{1}{3}$ of a year? $\frac{2}{3}$ of a year? $\frac{1}{4}$ of a year? $\frac{3}{4}$ of a year? $\frac{1}{6}$ of a year? $\frac{5}{6}$ of a year? $1\frac{1}{2}$ of a year?

3. What part of a foot are three inches? 4 inches? 6 inches? 11 inches? 9 inches? 8 inches?

4. How many minutes in $\frac{1}{4}$ of an hour? $\frac{1}{6}$ of an hour? $\frac{1}{3}$ of an hour? $\frac{1}{10}$ of an hour? $\frac{1}{12}$ of an hour?

5. By what number do you divide 60 to get $\frac{1}{12}$ of 60?

6. What is $\frac{1}{12}$ of 36? 48? 72? 96? 120?

7. If $\frac{5}{12}$ of an acre of land cost $15, what is the cost of $\frac{1}{12}$ of an acre? of an acre?

8. Two is $\frac{1}{12}$ of what number? 10 is $\frac{5}{12}$ of what number? 14 is $\frac{7}{12}$ of what number?

9. How much is $\frac{1}{2}$ of $\frac{1}{6}$? $\frac{1}{6}$ of $\frac{1}{2}$? $\frac{1}{2}$ of $\frac{4}{12}$? $\frac{1}{3}$ of $\frac{6}{12}$?

10. How many twelfths make 1? 2? 3? 5? 7?

11. What part of 12 is 2? 3? 4? 5? 6? 8? 9?

12. If eggs cost 24 cents a dozen, what is the cost of $\frac{1}{12}$ of a dozen? $\frac{2}{12}$ of a dozen? $\frac{1}{6}$ of a dozen?

13. What is $\frac{5}{12}$ of 36? 48? 84? 96? 60?

14. $\frac{1}{2}$ is equal to now many twelfths? $\frac{1}{3}$ is equal to how many twelfths? $\frac{1}{4}$ is equal to how many twelfths? $\frac{1}{6}$ is equal to how many twelfths?

15. How many twelfths in $\frac{1}{2}+\frac{1}{12}$? in $\frac{1}{3}+\frac{1}{12}$? in $\frac{1}{4}+\frac{1}{12}$? in $\frac{1}{2}-\frac{1}{12}$? in $\frac{1}{3}-\frac{1}{12}$? in $\frac{1}{4}-\frac{1}{12}$? in $3\times\frac{1}{12}$? in $4\times\frac{1}{12}$? in $6\times\frac{1}{12}$? in $\frac{1}{2}$ of $\frac{2}{12}$? in $\frac{1}{2}$ of $\frac{8}{12}$?

16. How many more minutes in $\frac{1}{10}$ of an hour than in $\frac{1}{12}$ of an hour? Which is greater, then, $\frac{1}{10}$ or $\frac{1}{12}$?

1. How many eighths are there in $\frac{1}{2}$? in $\frac{1}{4}$? in $\frac{3}{4}$? in $\frac{3}{4}$? in $\frac{4}{4}$? in 1 and $\frac{1}{8}$? in 1 and $\frac{1}{4}$? in 1 and $\frac{1}{2}$?

2. How many tenths are there in $\frac{1}{2}$? in $\frac{1}{5}$? in $\frac{3}{5}$? in $\frac{3}{5}$? in $\frac{4}{5}$? in 1 and $\frac{1}{10}$? in 1 and $\frac{1}{2}$? in 1 and $\frac{4}{5}$?

3. How many twelfths are there in $\frac{1}{2}$? in $\frac{1}{3}$? in $\frac{2}{3}$? in $\frac{1}{4}$? in $\frac{3}{4}$? in $\frac{1}{6}$? in $\frac{2}{6}$? in $\frac{3}{6}$? in $\frac{4}{6}$? in $\frac{5}{6}$?

4. Which is greater, $\frac{1}{2}$ or $\frac{5}{12}$? $\frac{1}{6}$ or $\frac{2}{12}$? $\frac{3}{6}$ or $\frac{5}{10}$?

5. How many ten-cent pieces make $\frac{1}{5}$ of a dollar?

6. A rug is 9 ft. long and its width is $\frac{1}{3}$ of its length. How wide is it? How many square feet does it contain?

7. If the width of a hall is $\frac{1}{4}$ of its length and its width is 5 ft., what is its length? How many square feet are there in its floor?

8. If the surface of a floor contains 60 sq. ft., how many square feet are there in $\frac{1}{2}$ of it? $\frac{1}{3}$ of it? $\frac{1}{4}$ of it? $\frac{1}{5}$ of it? $\frac{1}{6}$ of it? $\frac{1}{10}$ of it? $\frac{1}{15}$ of it? $\frac{2}{3}$ of it? $\frac{2}{5}$ of it? $\frac{3}{4}$ of it? $\frac{5}{6}$ of it? $\frac{7}{10}$ of it? $\frac{4}{15}$ of it?

9. If a 12-gallon keg is $\frac{2}{3}$ full of syrup, how many gallons does it contain?

10. What is the sum of $\frac{1}{3}$ of 15 and $\frac{1}{5}$ of 15?

11. If 24 peaches are divided so that Charles receives $\frac{2}{3}$ of them and Henry the rest, how many more will Henry receive than Charles?

12. How many more minutes in $\frac{2}{3}$ of an hour than in $\frac{1}{4}$ of an hour?

13. Into how many equal parts must a shipwrecked crew divide their provisions, so that they may have enough to last a week? What part of the whole will be consumed in 3 days?

What is the name of one of the parts when any-
thing is divided into :

1.	2 equal parts ?	**7.**	8 equal parts ?
2.	3 equal parts ?	**8.**	10 equal parts ?
3.	4 equal parts ?	**9.**	12 equal parts ?
4.	5 equal parts ?	**10.**	16 equal parts ?
5.	6 equal parts ?	**11.**	36 equal parts ?
6.	7 equal parts ?	**12.**	100 equal parts ?

A cake can be cut into how many :   .

13.	Halves ?	**21.**	Tenths ?
14.	Thirds ?	**22.**	Elevenths ?
15.	Fourths ?	**23.**	Twelfths ?
16.	Fifths ?	**24.**	Sixteenths ?
17.	Sixths ?	**25.**	Twentieths ?
18.	Sevenths ?	**26.**	Twenty-fifths ?
19.	Eighths ?	**27.**	Thirty-sixths ?
20.	Ninths ?	**28.**	Hundredths ?

When anything is divided into 12 equal parts,
what do we call :

29.	1 part ?	**32.**	4 parts ?	**35.**	8 parts ?
30.	2 parts ?	**33.**	5 parts ?	**36.**	10 parts ?
31.	3 parts ?	**34.**	6 parts ?	**37.**	12 parts ?

38. Three melons were divided among some boys.
If the first was cut into fourths, the second into
sixths, and the third into eighths, how many boys
could receive one piece of melon ?

39. How many boys can receive a piece of pie if 4
pies are divided into fifths ?

Lesson 19.

Any standard used in counting, or measuring, is called a unit. One book and one dozen of eggs are examples of units used in counting. One foot and one pound are units used in measuring.

Units are either whole units or **equal parts of whole units**; as one orange, one-fourth of an orange.

A unit which is one of the equal parts of a whole unit is called a **fractional unit**; numbers used in counting fractional units are called **fractions**; and numbers used in counting whole units are called **integers, or integral numbers**.

Name the fractional unit and the whole unit of which it is a fraction in the following expressions :

1. $\frac{3}{4}$ of an apple.   **7.** $\frac{4}{5}$ of a dollar.

2. $\frac{4}{5}$ of an inch.   **8.** $\frac{3}{4}$ of a foot.

3. $\frac{2}{11}$ of a rod.   **9.** $1\frac{1}{4}$ of a pound.

4. $\frac{5}{8}$ of a pie.   **10.** $\frac{1}{2}$ of an ounce.

5. $\frac{9}{10}$ of a dollar.   **11.** $\frac{7}{8}$ of a peck.

6. $\frac{5}{8}$ of a yard.   **12.** $\frac{4}{5}$ of a mile.

The upper number of a fraction is called the **numerator**, or *number-giver;* as it gives the *number* of fractional units taken. The lower number is called the **denominator**, or *name-giver;* as it gives the *name* of each part. The numerator and denominator are called the **terms** of the fraction.

Write in figures :

13. five sixths.   **17.** two seventeenths.

14. three sevenths.   **18.** seven fiftieths.

15. nine elevenths.   **19.** eleven eightieths.

16. ten twentieths.   **20.** thirteen hundredths.

21. Read : $\frac{5}{7}$, $\frac{7}{12}$, $\frac{2}{15}$, $\frac{13}{24}$, $\frac{10}{21}$, $\frac{5}{32}$, $\frac{9}{25}$, $\frac{19}{100}$.

Lesson 20.

Ex. 1. What is the meaning of $\frac{5}{6}$ yd?

The denominator shows that the unit, one yard, is divided into 6 equal parts, and the numerator 5 means that 5 of these parts are taken.

Ex. 2. What is the meaning of $\frac{3}{4}$ standing alone?

The denominator 4 shows that the unit, whatever that unit is, is divided into 4 equal parts, and the numerator 3 means that three of these fourths are taken.

In the same way what is the meaning of:

1. $\frac{5}{8}$ lb?   **5.** $\$\frac{9}{10}$?   **9.** $\frac{3}{4}$ yd?   **13.** $\frac{7}{12}$?

2. $\frac{3}{4}$ bu.?   **6.** $\$\frac{3}{4}$?   **10.** $\frac{7}{11}$ rd.?   **14.** $\frac{9}{16}$?

3. $\frac{1}{2}$ qt.?   **7.** $\$\frac{1}{2}$?   **11.** $\frac{3}{8}$ gal.?   **15.** $\frac{5}{24}$?

4. $\frac{5}{16}$ cd.?   **8.** $\$\frac{83}{100}$?   **12.** $\frac{7}{10}$ ton?   **16.** $\frac{13}{36}$?

What is the value of:

17. $\frac{3}{4}$ lb. in oz.?   **27.** $\frac{4}{5}$ t. in cwt.?

18. $\frac{2}{3}$ ft. in in.?   **28.** $\frac{3}{4}$ cd. in cd. ft.?

19. $\$\frac{9}{20}$ in cents?   **29.** $\frac{17}{36}$ yd. in in.?

20. $\frac{2}{5}$ cwt. in lb.?   **30.** $\frac{5}{32}$ bu. in qt.?

21. $\frac{7}{60}$ hr. in min.?   **31.** $\frac{3}{8}$ mi. in rd.?

22. $\frac{1}{4}$ mi. in rd.?   **32.** $\frac{2}{3}$ cu. yd. in cu. ft.?

23. $\frac{1}{3}$ yd. in ft.?   **33.** $\frac{2}{3}$ sq. yd. in sq. ft.?

24. $\frac{3}{4}$ yd. in in.?   **34.** $\frac{7}{9}$ sq. yd. in sq. ft.?

25. $\frac{3}{4}$ gal. in pt.?   **35.** $\frac{7}{9}$ cu. yd. in cu. ft.?

26. $\frac{3}{4}$ pk. in qt.?   **36.** $\frac{3}{4}$ A. in sq. rd.?

37. If a farmer's wife makes 25 lb. butter a week and sells $\frac{4}{5}$ of it, how many pounds does she sell?

38. If a boy has 5 eggs, how many more does he need to make $\frac{5}{6}$ of a dozen?

Lesson 21.

1. What kind of a measure will $\frac{1}{8}$ of a gallon fill? $\frac{1}{4}$ of a gallon? $\frac{1}{2}$ of a gallon?

2. If Joseph can hoe his cornfield in 6 days, what part can he hoe in 1 day? in 2 days? in 5 days?

3. If a boy has gone $\frac{2}{5}$ of the distance to school, how many fifths of the distance remain?

4. If an ounce of silver costs $\$\frac{2}{3}$, what is the cost of 10 ounces?

5. If building $\frac{2}{3}$ of a wall costs $15, what is the cost of building $\frac{1}{3}$ of it? $\frac{2}{3}$ of it? of building the whole wall?

6. What is the sum of $\frac{1}{3}$ of 12 and $\frac{1}{4}$ of 20?

7. Charles has 13 marbles and John has 18. How many will each have if John gives $\frac{1}{8}$ of his marbles to Charles?

8. A purse contains 16 quarters of a dollar and there are 50 ten-cent pieces in a box. Which contains more money? How much more?

9. If a painter charges $1 for $\frac{1}{3}$ of a day's work, what is his charge for a day? for 6 days?

10. Henry Jones sold a sleigh which cost $40 for $\frac{5}{8}$ of its cost. How many dollars did he lose?

11. If 7 men earn $28, what part of $28 does 1 man earn? 5 men?

12. Paul had 30 apples and divided $\frac{2}{3}$ of them among 5 boys. How many did each boy receive?

13. If eggs are worth 3 cents apiece, what is the cost of $\frac{3}{4}$ of a dozen of eggs?

14. What is the whole unit in $\frac{3}{4}$ of a dozen?

15. How many sevenths in the whole of anything?

A **mixed number** consists of a whole number and a fraction ; as $2\frac{3}{4}$, read two *and* three-fourths.

A **proper fraction** is a fraction whose numerator is smaller than its denominator ; as $\frac{7}{8}$.

An **improper fraction** is a fraction whose numerator is not smaller than its denominator ; as $\frac{7}{7}$, $\frac{8}{5}$.

Name the proper fractions, the improper fractions, and the mixed numbers of the following :

$\frac{3}{4}$, $1\frac{5}{8}$, $\frac{4}{3}$, $\frac{6}{5}$, $3\frac{1}{4}$, $2\frac{3}{5}$, $7\frac{1}{2}$, $\frac{8}{7}$, $\frac{9}{2}$, $\frac{4}{3}$, $\frac{5}{6}$, $1\frac{6}{3}$, $5\frac{1}{3}$, $1\frac{1}{2}$, $1\frac{2}{5}$, $8\frac{1}{8}$, $3\frac{3}{8}$, $1\frac{1}{8}$, $\frac{5}{32}$, $3\frac{31}{32}$, $3\frac{2}{9}$, $\frac{7}{16}$, $1\frac{3}{4}$, $8\frac{2}{3}$, $\frac{37}{4}$, $\frac{8}{25}$, $1\frac{8}{16}$, $1\frac{5}{8}$, $9\frac{1}{3}$, $7\frac{8}{5}$, $4\frac{5}{7}$, $\frac{63}{7}$, $\frac{4}{5}$.

Ex. 1. How many dollars are there in 8 quarters ?

Since 4 quarters make one dollar, there will be as many dollars in 8 quarters as there are 4's in 8 ; that is, 2 dollars.

Ex. 2. How many dollars are there in 9 quarters ?

Since 4 quarters make one dollar, there will be as many dollars in' 9 quarters as there are 4's in 9 ; that is, 2 dollars and 1 quarter over, or $2\frac{1}{4}$ dollars.

1. How many yards in $1\frac{2}{3}$ yd. ? in $1\frac{5}{4}$ yd. ?

2. How many bushels in $\frac{7}{5}$ bu. ? in $\frac{9}{4}$ bu. ? in $1\frac{7}{8}$ bu. ? in $1\frac{9}{4}$ bu. ? in $2\frac{9}{4}$ bu. ? in $1\frac{3}{7}$ bu. ? in $2\frac{1}{3}$ bu. ?

3. How many pounds in $1\frac{9}{5}$ lb. ? in $1\frac{2}{4}$ lb. ? in $1\frac{7}{8}$ lb. ? in $1\frac{8}{6}$ lb. ? in $1\frac{7}{4}$ lb. ?

4. How many dollars in $\$1\frac{9}{2}$? in $\$2\frac{0}{4}$? in $\$1\frac{5}{3}$? in $\$2\frac{3}{5}$? in $\$4\frac{5}{6}$? in $\$1\frac{7}{4}$? in $\$2\frac{5}{4}$? in $\$3\frac{7}{5}$?

5. How many units and what part of another unit in $1\frac{7}{2}$? in $1\frac{7}{3}$? in $1\frac{7}{4}$? in $1\frac{7}{5}$? in $1\frac{7}{6}$? in $1\frac{7}{7}$? in $1\frac{7}{8}$? in $2\frac{9}{9}$? in $\frac{29}{11}$?

Lesson 23.

How many units are there in :

1. $\frac{4 9}{9}$ lb. ?	**6.** $\frac{1 9}{7}$?	**11.** $\frac{3 3}{1 0}$?	**16.** $\frac{4 9}{3}$?
2. $\frac{1 3}{3}$ in. ?	**7.** $\frac{1 6}{4}$?	**12.** $\frac{3 2}{8}$?	**17.** $\frac{1 3}{2}$?
3. $\frac{7 2}{4}$ bu. ?	**8.** $\frac{3 1}{6}$?	**13.** $\frac{1 6}{3}$?	**18.** $\frac{6 3}{2}$?
4. $\frac{3 2}{6}$ qt. ?	**9.** $\frac{2 5}{3}$?	**14.** $\frac{2 4}{8}$?	**19.** $\frac{3 5}{9}$?
5. $\frac{1 1}{2}$ ft. ?	**10.** $\frac{2 7}{6}$?	**15.** $\frac{2 3}{6}$?	**20.** $\frac{4 9}{7}$?

21. How many bushels of peaches are there in 27 baskets, if each basket contains $\frac{1}{4}$ bu. ?

22. How many gallons will be required to fill 18 bottles, if each bottle holds $\frac{1}{6}$ gal. ?

23. How many pounds of tea will be required to make 36 half-pound packages?

24. A merchant has 35 packages of cream of tartar, each containing $\frac{1}{4}$ lb. How many pounds of cream of tartar has he?

25. A boy has 25 quarters of a dollar. How many dollars has he ?

26. If a man's steps average $\frac{9}{4}$ ft., how many feet long is his step?

27. If a house is $\frac{4 0}{3}$ yd. long, how many yards is the length of the house? How many feet?

28. If a barrel holds $\frac{1 1}{4}$ bushels of apples, how many bushels does the barrel hold?

29. If $\frac{6 3}{2}$ gal. of water fill a barrel, how many gallons does the barrel hold?

30. If a pail contains $\frac{1 5}{2}$ qt. of water, how many quarts does it contain? How many pint bottles can be filled from the pail?

31. How many dozens of bananas in $\frac{1 3}{3}$ doz. ?

Lesson 24.

1. How many half-dollars are there in $3? $4? $7? $10? $15? $25?

2. How many quarters are there in $1, $5, $11?

3. How many half-dollars are there in 3\frac{1}{2}$? 5\frac{1}{2}$?

4. How many quarters are there in 1\frac{1}{4}$? 2\frac{3}{4}$? 5\frac{1}{4}$? 10\frac{3}{4}$?

5. How many fifths are there in 3? 8? 13? 3$\frac{2}{5}$? 9$\frac{1}{5}$? 5$\frac{3}{5}$? 6$\frac{4}{5}$? 10$\frac{2}{5}$?

6. How many sixths are there in 2? 5? 9? 15? 3$\frac{1}{6}$? 3$\frac{5}{6}$? 4$\frac{4}{6}$? 8$\frac{1}{6}$?

7. How many sevenths are there in 1? 3? 7? 11? 2$\frac{2}{7}$? 5$\frac{3}{7}$? 8$\frac{4}{7}$? 12$\frac{1}{7}$?

8. How many eighths are there in 5? 6? 9? 10? 1$\frac{7}{8}$? 2$\frac{5}{8}$? 7$\frac{3}{8}$? 8$\frac{1}{8}$?

9. How many ninths are there in 2? 7? 11? 12? 3$\frac{1}{9}$? 4$\frac{7}{9}$? 5$\frac{3}{9}$? 6$\frac{8}{9}$?

10. How many tenths are there in 5? 8? 11? 16? 5$\frac{1}{10}$? 7$\frac{3}{10}$? 9$\frac{7}{10}$? 10$\frac{9}{10}$? 11$\frac{1}{10}$?

11. How many ten-cent pieces should a man receive for 2\frac{1}{2}$?

12. If 6 apples are divided equally among some boys so that each boy receives $\frac{1}{2}$ of an apple, how many boys are there?

13. John cut 8 apples into thirds and Frank cut 7 apples into quarters. How many more pieces had Frank than John?

14. A man has 3\frac{3}{4}$ in quarters, how many quarters has he?

15. How many cents are there in $3? $4? $5? 2\frac{1}{2}$? 3\frac{3}{4}$? 1\frac{1}{2}$? 2\frac{3}{10}$? 4\frac{7}{10}$?

Lesson 25.

1. A cook has five cakes. How many more pieces will she have, if she cuts them into sixths, than if she cuts them into quarters?

2. If a cook gives a quarter of a cake to each of 7 boys, how many cakes must she cut?

3. If a string is 3¾ yards long and another string is 2¼ yards long, how many more quarters of a yard are there in the length of one than of the other?

4. The distance between two windows is 1⅔ yd. How many times must a foot rule be applied to measure the distance?

5. There are 16½ ft. in a rod. How many times must a half-foot rule be applied to measure a rod?

6. A grocer puts up 32 lbs. of tea in ½ lb. packages. How many packages does he make?

7. What will 7½ yd. of silk cost, if ½ yd. costs $1?

8. How many eighths of a pound in 6⅞ lb.?

9. How many pint bottles can be filled with 18½ quarts of water?

10. How many quarts are there in 7⅔ pecks?

11. How many stones will be needed to pave a walk containing 15¾ sq. ft., if the upper surface of each stone contains ¼ sq. ft.?

12. How many blocks containing ⅛ cu. ft. will fill a space containing 9⅞ cu. ft.?

13. In 4½ how many halves? fourths?

14. In 5¾ how many fourths? eighths?

15. In 6⅔ how many thirds? sixths?

16. In 4⅘ how many fifths? tenths?

17. In 2⅚ how many sixths? twelfths?

Lesson 26.

1. How many quarters of a dollar in $\$\frac{1}{2}$?

2. How many halves are there in $\frac{2}{4}$? $\frac{4}{4}$? $\frac{6}{4}$? $\frac{10}{4}$?

Changing $\frac{2}{4}$ to $\frac{1}{2}$ we call reducing $\frac{2}{4}$ to its *lowest terms.* A fraction is in its lowest terms when no whole number, except 1, will divide both its terms without a remainder.

3. How many sixths of an apple in $\frac{1}{3}$ of an apple ?

4. How many thirds are there in $\frac{2}{3}$? $\frac{4}{3}$? $\frac{6}{3}$? $\frac{16}{6}$?

5. How many eighths of a peck in $\frac{1}{4}$ pk. ?

6. How many fourths are there in $\frac{2}{8}$? $\frac{4}{8}$? $\frac{6}{8}$? $\frac{12}{8}$?

7. How many tenths of a dollar in $\$\frac{1}{2}$?

8. How many fifths are there in $\frac{2}{10}$? $\frac{4}{10}$? $\frac{6}{10}$? $\frac{8}{10}$?

9. How many twelfths of a dozen in $\frac{1}{3}$ doz. ?

10. How many sixths in $\frac{2}{12}$? $\frac{4}{12}$? $\frac{6}{12}$? $\frac{8}{12}$? $\frac{10}{12}$?

11. How many sixths of an orange in $\frac{1}{2}$ of an orange ?

12. How many halves in $\frac{2}{6}$? $\frac{6}{8}$? $\frac{14}{6}$?

13. Which is greater, $\frac{4}{6}$ or $\frac{2}{3}$? $\frac{3}{12}$ or $\frac{1}{4}$? $\frac{12}{8}$ or $\frac{3}{4}$? $\frac{6}{8}$ or $\frac{3}{4}$? $\frac{12}{18}$ or $\frac{2}{3}$?

Express in lowest terms :

14. $\frac{3}{6}$.	**20.** $\frac{5}{10}$.	**26.** $\frac{10}{12}$.	**32.** $\frac{10}{18}$.	**38.** $\frac{15}{36}$.
15. $\frac{4}{6}$.	**21.** $\frac{3}{12}$.	**27.** $\frac{2}{14}$.	**33.** $\frac{15}{20}$.	**39.** $\frac{18}{18}$.
16. $\frac{6}{8}$.	**22.** $\frac{4}{12}$.	**28.** $\frac{3}{18}$.	**34.** $\frac{18}{24}$.	**40.** $\frac{32}{40}$.
17. $\frac{4}{8}$.	**23.** $\frac{6}{12}$.	**29.** $\frac{12}{18}$.	**35.** $\frac{8}{18}$.	**41.** $\frac{50}{100}$.
18. $\frac{6}{8}$.	**24.** $\frac{12}{18}$.	**30.** $\frac{5}{10}$.	**36.** $\frac{14}{18}$.	**42.** $\frac{75}{100}$.
19. $\frac{4}{10}$.	**25.** $\frac{12}{18}$.	**31.** $\frac{7}{14}$.	**37.** $\frac{15}{25}$.	**43.** $\frac{90}{100}$.

44. What part of a pound are 6 oz. ? 12 oz. ?

NOTE. — In all examples we reduce the answers to their simplest form, by reducing fractions to their lowest terms and changing improper fractions to whole or mixed numbers.

Lesson 27.

1. What is the product of 5×3 books?

2. What is the product of 5×3 fourths?

3. What is the product of $5 \times \frac{3}{4}$?

4. What is the product of $7 \times \frac{1}{2}$? $11 \times \frac{3}{5}$? $8 \times \frac{4}{7}$?

$12 \times \frac{6}{11}$? $5 \times 1\frac{1}{2}$? $4 \times \frac{5}{8}$? $6 \times \frac{9}{13}$? $9 \times \frac{11}{15}$?

5. What is the product of $6 \times \frac{5}{8}$? of $\frac{5}{8} \times 6$?

Solution : $6 \times \frac{1}{8} = \frac{6}{8}$ or $\frac{3}{4}$; therefore $6 \times \frac{5}{8} = 5 \times \frac{3}{4} = \frac{15}{4}$, or $3\frac{3}{4}$.

6. What is the product of $7 \times \frac{5}{14}$? of $\frac{5}{14} \times 7$?

7. Find the product of $5 \times \frac{1}{10}$. $6 \times \frac{1}{12}$. $8 \times \frac{3}{4}$.

$12 \times \frac{5}{8}$. $4 \times \frac{7}{8}$. $5 \times \frac{4}{15}$. $7 \times \frac{3}{14}$. $3 \times 1\frac{1}{2}$. $5 \times \frac{7}{10}$.

8. How many ounces are there in $\frac{3}{4}$ lb.? $\frac{7}{8}$ lb.?

9. How many pounds are there in $\frac{3}{5}$ of 100 lb.?

10. How many quarts are there in $\frac{1}{4}$ bu.? $\frac{3}{8}$ bu.?

11. How many dollars in $15 \times \$\frac{3}{5}$?

12. How many years in $\frac{3}{5}$ of a century?

What is the product of :

13. $2 \times \frac{3}{8}$?	**26.** $\frac{3}{4} \times 16$?	**39.** $\frac{9}{20}$ of 6?
14. $3 \times \frac{3}{4}$?	**27.** $\frac{3}{8} \times 16$?	**40.** $\frac{3}{15}$ of 20?
15. $3 \times \frac{7}{8}$?	**28.** $1\frac{1}{10} \times 5$?	**41.** $\frac{3}{4}$ of 36?
16. $15 \times \frac{3}{4}$?	**29.** $\frac{9}{14} \times 7$?	**42.** $\frac{3}{8}$ of 36?
17. $12 \times \frac{3}{4}$?	**30.** $\frac{3}{16} \times 8$?	**43.** $\frac{3}{30} \times 15$?
18. $8 \times \frac{3}{8}$?	**31.** $\frac{3}{4} \times 9$?	**44.** $7 \times \frac{5}{14}$?
19. $7 \times \frac{3}{16}$?	**32.** $\frac{2}{15} \times 10$?	**45.** $\frac{5}{16} \times 24$?
20. $4 \times 1\frac{3}{4}$?	**33.** $\frac{3}{8}$ of 15?	**46.** $\frac{5}{12} \times 14$?
21. $3 \times \frac{7}{12}$?	**34.** $\frac{5}{12}$ of 24?	**47.** $3 \times \frac{8}{25}$?
22. $8 \times \frac{5}{16}$?	**35.** $\frac{9}{25}$ of 5?	**48.** $21 \times \frac{5}{12}$?
23. $\frac{3}{8} \times 3$?	**36.** $\frac{5}{21}$ of 6?	**49.** $24 \times \frac{7}{4}$?
24. $\frac{3}{4} \times 12$?	**37.** $1\frac{1}{10}$ of 8?	**50.** $30 \times \frac{5}{8}$?
25. $\frac{5}{4} \times 12$?	**38.** $\frac{5}{8}$ of 9?	**51.** $100 \times \frac{3}{10}$?

Lesson 28.

1. How many pints of vinegar will be required to fill 24 bottles each containing ½ of a pt. ?

2. What is the cost of 18 yd. of muslin at $⅔ a yard ?

3. How many quarts in ⅛ of a bushel of berries ?

4. If Henry can dig ₂⁄₅ of a ditch in 1 day, what part of the ditch can he dig in 15 days ?

5. If the hour-hand moves ₁⁄₁₂ of the distance around the dial in 1 hour, what part of the dial will it move over in 9 hours ?

6. How many yards of ribbon will be needed to make 40 bows, each containing ⅞ of a yard ?

7. If a pump delivers ⅝ of a quart at each stroke, how many quarts will be delivered by 32 strokes ?

8. If 15 lb. of sugar can be bought for $1, what part of a dollar is the cost of 1 lb. ?

9. How many quarts of coffee will be needed to give each of 36 men a cup containing ½ pt. ?

10. What is the cost of 42 lb. of scrap iron at ₂⁄₇ of a cent a pound ?

11. If a furnace consumes ⅙ of a ton of coal a day, how many tons will it consume in 30 days ?

12. How many square rods are there in ₃⁄₁₆ A. ?

13. How many minutes are there in ⅘ of an hour ?

14. How many quarts of milk will be needed to supply 12 families, if each family uses 2½ quarts ?

15. If a horse eats 4⅔ quarts of corn in 1 day, how many quarts will he eat in 15 days ?

16. If Henry is 20 years old and Charles is ⅘ as old, what is the sum of their ages ?

Lesson 29.

1. What is the product of 2×3 ? of $2 \times \frac{1}{2}$? What then is the product of $2 \times 3\frac{1}{2}$?

2. What is the product of 3×6 ? of $3 \times \frac{2}{3}$? What then is the product of $3 \times 6\frac{2}{3}$?

3. What is the product of 4×7 ? of $4 \times \frac{1}{4}$? What then is the product of $4 \times 7\frac{1}{4}$?

4. What is the product of 6×5 ? of $6 \times \frac{3}{4}$? What then is the product of $6 \times 5\frac{3}{4}$?

5. What is the product of $5 \times 3\frac{2}{5}$? $7 \times 6\frac{1}{7}$? $4 \times 6\frac{1}{8}$? $3\frac{1}{8} \times 6$? $10\frac{1}{2} \times 8$? $3 \times 9\frac{1}{4}$?

NOTE. — In the following examples count a fraction of a cent a whole cent, as is usually done.

What is the cost of :

6. $3\frac{1}{4}$ doz. eggs at 16 cents a dozen ?

7. $4\frac{1}{2}$ lb. of tea at 50 cents a pound ?

8. $4\frac{1}{4}$ lb. of sugar at 6 cents a pound ?

9. 8 cans of tomatoes at $12\frac{1}{2}$ cents a can ?

10. 8 lb. of ham at $15\frac{1}{2}$ cents a pound ?

11. $5\frac{1}{4}$ lb. of bacon at 16 cents a pound ?

12. $2\frac{1}{2}$ lb. of steak at 23 cents a pound ?

13. $2\frac{3}{4}$ lb. of cheese at 18 cents a pound ?

14. $5\frac{1}{4}$ lb. of halibut at 15 cents a pound ?

15. $2\frac{2}{3}$ lb. of coffee at 36 cents a pound ?

16. $3\frac{3}{8}$ yd. of velvet at $4 a yard ?

17. 12 lb. of copper at $10\frac{1}{2}$ cents a pound ?

18. $8\frac{1}{4}$ yd. of cotton cloth at 6 cents a yard ?

19. $5\frac{2}{3}$ yd. of cotton cloth at 8 cents a yard ?

20. 12 lb. of nails at $2\frac{2}{3}$ cents a pound ?

21. $8\frac{1}{4}$ gal. of vinegar at 20 cents a gallon ?

Lesson 30.

1. If a man walks 3 miles an hour, how far will he walk in 3½ hours?

2. What is the railway fare for 22 miles at 2½ cents a mile?

3. What is the weight of 4 gal. of milk at 7¾ lb. to the gallon?

4. What is the weight of 3¼ cu. ft. of dry white pine at 25 lb. for each cubic foot?

5. What is the weight of 1¼ cu. ft. of dry white oak at 52 lb. a cubic foot?

6. If cork weighs 15 lb. per cubic foot, what will 5⅔ cu. ft. weigh?

7. If a cubic foot holds ⅘ of a bushel, how many bushels will a bin hold if it contains 15 cu. ft.?

8. If a bushel equals 1¼ cu. ft., how many cubic feet will be required to hold 18 bushels?

9. If a man earns $2⅔ a day, how much will he earn in 12 days?

10. If Joseph rows 3⅘ miles in an hour, how far can he row in 4 hours?

What is the cost of:

11. 2⅖ acres of land at $40 an acre?

12. 28 rods of fence at $3¼ a rod?

13. 6⅔ tons of hay at $15 a ton?

14. 16 yards of carpet at $1¼ a yard?

15. 30 cords of wood at $3⅔ a cord?

16. If 6 men can mow a field in 2½ hours, in how many hours can one man do the work?

1. How many inches are there in 4½ ft. ? 3⅓ ft. ?

2. How many quarts are there in 3¾ gal. ? 6½ gal. ? 2⅞ gal. ?

3. How many ounces are there in 1¾ lb. ? 5½ lb. ? 1⅞ lb. ? 4³⁄₁₆ lb. ?

4. How many hundredweight are there in 1⅞ t. ? 2¼ t. ? 3¹⁄₁₀ t. ? 1¹¹⁄₂₀ t. ?

5. How many eggs are there in 2⅞ doz. ? 3¼ doz. ? 1⅞ doz. ? 7½ doz. ? 2¹¹⁄₂ doz. ?

6. How many feet are there in 5½ yd. ? 7⅔ yd. ?

7. How many cubic feet are there in 1⅓ cu. yd. ?

8. How many square feet are there in 2⅓ sq. yd. ?

9. How many quarts are there in 1¼ pk. ? 3⅓ pk. ?

10. What is the cost of a ton of steel at 1¼ cents a pound ?

11. A farmer bought a cow for $36 and sold her for 1¼ times the cost. What was the selling price ? How many dollars did he gain ?

12. If an average hill of potatoes contains ¼ of a peck, how many bushels will 48 hills contain ?

13. If a square rod of land produces 1¾ bu. of potatoes, how many bushels will ¼ of an acre produce ?

14. If a man hires some money agreeing to pay $1⅛ for every dollar borrowed, how much should he pay if he borrows $48 ?

15. What is the cost of 6 dozen cans of peas at $1⅞ a dozen ?

16. If a boy picks 1¾ quarts of berries in an hour, how many quarts can he pick in 5 hours ?

Lesson 32.

1. What is $\frac{1}{2}$ of $\frac{1}{3}$, or $\frac{1}{2} \times \frac{1}{3}$?

2. What is the product of $\frac{1}{3} \times \frac{1}{4}$? $\frac{1}{3} \times \frac{3}{4}$? $\frac{2}{3} \times \frac{3}{4}$?

3. What is the product of $\frac{3}{10} \times \frac{8}{9}$?

4. What is the product of $\frac{2}{7} \times \frac{14}{9}$? of $\frac{14}{9} \times \frac{2}{7}$?

What is the product of :

5. $\frac{2}{3} \times \frac{4}{7}$?	**13.** $\frac{2}{3} \times \frac{9}{11}$?	**21.** $\frac{7}{10} \times \frac{5}{21}$?
6. $\frac{3}{8} \times \frac{2}{3}$?	**14.** $\frac{3}{4} \times 1\frac{1}{2}$?	**22.** $\frac{1}{11} \times \frac{22}{5}$?
7. $\frac{2}{7} \times \frac{2}{3}$?	**15.** $\frac{7}{4} \times \frac{5}{21}$?	**23.** $\frac{3}{11}$ of $\frac{22}{3}$?
8. $\frac{3}{4} \times \frac{2}{3}$?	**16.** $\frac{5}{8} \times 1\frac{2}{3}$?	**24.** $\frac{5}{13}$ of $\frac{39}{35}$?
9. $\frac{2}{7} \times \frac{10}{7}$?	**17.** $\frac{7}{8} \times \frac{9}{14}$?	**25.** $\frac{2}{3}$ of $\frac{10}{7}$?
10. $\frac{3}{4} \times \frac{4}{7}$?	**18.** $\frac{5}{8} \times 1\frac{5}{8}$?	**26.** $\frac{3}{8}$ of $\frac{24}{5}$?
11. $\frac{2}{3} \times \frac{6}{7}$?	**19.** $\frac{5}{8} \times 2\frac{4}{5}$?	**27.** $\frac{2}{3}$ of $\frac{14}{5}$?
12. $\frac{3}{4} \times \frac{8}{9}$?	**20.** $\frac{7}{10} \times 1\frac{4}{7}$?	**28.** $\frac{8}{9}$ of $\frac{15}{4}$?

29. If the fuel for a furnace costs $\$\frac{5}{8}$ a day, what is the cost for $\frac{2}{5}$ of a day ?

30. A man owning $\frac{5}{18}$ of a vessel sold $\frac{2}{5}$ of his share. What part of the whole vessel did he sell ?

31. If a field produces $\frac{5}{8}$ of a bale of cotton, what part of a bale will $\frac{9}{10}$ of the field produce ?

32. If a pulp mill uses $\frac{7}{8}$ of a cord of spruce in 1 hour, what part of a cord will it use in $\frac{4}{5}$ of an hour ?

33. A lot containing $1\frac{5}{8}$ of an acre was divided equally among 5 people. What part of an acre did each receive ? How many square rods ?

34. If $\frac{2}{3}$ of the population of a town is less than 21 years old and $\frac{1}{2}$ of those under 21 attend school, what part of the whole population attends school ?

Lesson 33.

NOTE. When we multiply a mixed number by a fraction, we generally change the mixed number to an improper fraction, and then proceed to multiply.

What is the product of :

1. $\frac{2}{3} \times 1\frac{1}{2}$?	**9.** $\frac{2}{11}$ of $5\frac{1}{2}$?	**17.** $\frac{7}{10} \times 2\frac{4}{7}$?
2. $\frac{3}{8} \times 1\frac{2}{3}$?	**10.** $\frac{2}{7}$ of $4\frac{2}{3}$?	**18.** $4\frac{2}{3} \times \frac{4}{7}$?
3. $\frac{1}{2} \times 2\frac{2}{3}$?	**11.** $\frac{7}{8}$ of $1\frac{1}{14}$?	**19.** $50 \times \frac{1}{100}$?
4. $\frac{4}{7} \times 1\frac{2}{3}$?	**12.** $\frac{1}{8}$ of $3\frac{2}{7}$?	**20.** $\frac{1}{2}$ of $3\frac{2}{3}$?
5. $\frac{3}{8} \times 2\frac{1}{2}$?	**13.** $1\frac{1}{2} \times 1\frac{1}{3}$?	**21.** $\frac{6}{8}$ of $4\frac{1}{2}$?
6. $\frac{1}{10} \times 3\frac{1}{8}$?	**14.** $2\frac{1}{8} \times 1\frac{1}{7}$?	**22.** $\frac{2}{13}$ of $6\frac{1}{2}$?
7. $\frac{4}{5}$ of $1\frac{2}{7}$?	**15.** $3\frac{1}{2} \times \frac{4}{7}$?	**23.** $\frac{9}{20}$ of $6\frac{2}{3}$?
8. $\frac{6}{8}$ of $1\frac{4}{5}$?	**16.** $1\frac{1}{8} \times 1\frac{2}{7}$?	**24.** $\frac{8}{11}$ of $5\frac{1}{2}$?

What is the cost of :

25. $3\frac{1}{7}$ yd. of silk at $2\frac{1}{8}$ a yard ?

26. $2\frac{1}{8}$ yd. of silk at $1\frac{1}{2}$ a yard ?

27. $2\frac{1}{2}$ yd. of satin at $1\frac{1}{8}$ a yard ?

28. $3\frac{1}{8}$ doz. cans of peaches at $3\frac{3}{10}$ a dozen ?

29. $3\frac{1}{4}$ doz. cans of tomatoes at $1\frac{1}{8}$ a dozen ?

30. $2\frac{1}{8}$ thousand shingles at $2\frac{4}{5}$ a thousand ?

31. $1\frac{1}{2}$ cords of wood at $3\frac{2}{3}$ a cord ?

32. $2\frac{1}{2}$ tons of coal at $4\frac{4}{5}$ a ton ?

33. $3\frac{1}{2}$ bu. of wheat at $1\frac{1}{7}$ a bushel ?

34. $2\frac{1}{2}$ bu. of beans at $2\frac{1}{2}$ a bushel ?

35. $2\frac{4}{5}$ thousand feet of gas at $1\frac{1}{4}$ a thousand ?

36. $3\frac{1}{8}$ bundles of clapboards at $2\frac{1}{2}$ a bundle ?

37. $2\frac{1}{2}$ kegs of nails, at $2\frac{1}{8}$ a keg ?

38. A man bought 3 lb. of mutton at $15\frac{3}{4}$ cents a pound and $2\frac{1}{7}$ lb. of cheese at 14 cents a pound. What change should he receive for $1 ?

Lesson 34.

What is the cost of:

1. 3¾ bu. of salt at $⅔ a bushel ?

2. The car fare for 36 miles at 2⅛ cents a mile ?

3. 7 cans of peas at $⅔ a can ?

4. 3 lb. of pork at 12½ cents a pound ?

5. 9 cans of cherries at $¼ a can ?

6. 12 bushels of corn at $⅔ a bushel ?

7. 3⅓ quarts of blueberries at 15 cents a quart ?

8. ⅔ of a flock of 14 sheep, if 1 sheep costs $5 ?

9. 2 lb. 12 oz. of butter at 24 cents a pound ?

10. How many yards are there in 2 rods ? 5 rods ?

11. How many feet are there in 2 rods ? 4 rods ?

12. If a man earns $1⅔ a day, how much will he earn in 7½ days ?

13. If a man walks 3⅓ miles in an hour, how far will he walk in 1¾ hours ?

14. Allowing 1¼ lb. for each man, how many pounds of beef will be needed for 10 men. ?

15. If a furnace consumes 1⅔ tons of coal in a month, how many tons will it consume in 3⅓ months ?

16. How many minutes are there in ⅔ of an hour ?

17. How many yards are there in ½ of a rod ?

18. If a box of oranges costs $4½, what is the cost of ⅓ of a box ?

19. If a man owned ⅘ of a vessel and sold ⅔ of his share, what part of the vessel did he sell ?

20. If a bushel of hard coal weighs ⅔ of a hundred-weight, how much will 20 bushels weigh ?

21. If a bushel of soft coal weighs $\frac{7}{10}$ of a hundredweight, how much will 20 bushels weigh ?

1. If a man has $4 in $1 bills, how many bills has he ? If he has $4 in half-dollars, how many half-dollars has he ?

2. If dividing 4 by 1 means finding how many ones there are in 4, what is the meaning of 4 divided by $\frac{1}{2}$? How many halves are there in 4 ?

3. How many halves are there in 6 apples ? What then is the quotient of $6 \div \frac{1}{2}$?

4. How many thirds are there in 2 pies ? What then is the quotient of $2 \div \frac{1}{3}$?

5. How many quarters are there in $3 ? What then is the quotient of $3 \div \frac{1}{4}$?

6. Among how many boys can 4 apples be divided, if each boy receives $\frac{1}{2}$ of an apple ? $\frac{2}{3}$ of an apple ?

7. What is the quotient of $4 \div \frac{2}{3}$?

8. If a cook has 3 cakes, to how many girls can she give $\frac{1}{4}$ of a cake ? $\frac{3}{4}$ of a cake ?

9. What is the quotient of $3 \div \frac{3}{4}$?

10. What is the product of 3 multiplied by $\frac{4}{3}$?

11. If a man has 4 melons, to how many boys can he give $\frac{1}{3}$ of a melon ? $\frac{3}{5}$ of a melon ?

12. What is the quotient of $4 \div \frac{3}{5}$?

13. What is the product of 4 multiplied by $\frac{5}{3}$?

14. If 3 divided by $\frac{3}{4}$ is the same as 3 multiplied by $\frac{4}{3}$, and 4 divided by $\frac{3}{5}$ is the same as 4 multiplied by $\frac{5}{3}$, then 6 divided by $\frac{2}{3}$ is the same as 6 multiplied by what fraction ?

Hence, in dividing by a fraction

We invert the fraction and multiply the dividend by the inverted fraction.

Lesson 36.

What is the quotient of:

1. $6 \div \frac{2}{3}$?	**7.** $12 \div \frac{1}{4}$?	**13.** $6 \div \frac{6}{7}$?
2. $6 \div \frac{3}{4}$?	**8.** $12 \div \frac{4}{5}$?	**14.** $8 \div \frac{2}{3}$?
3. $9 \div \frac{2}{3}$?	**9.** $12 \div \frac{6}{7}$?	**15.** $9 \div \frac{3}{4}$?
4. $10 \div \frac{5}{6}$?	**10.** $12 \div \frac{8}{9}$?	**16.** $16 \div \frac{4}{7}$?
5. $12 \div \frac{2}{3}$?	**11.** $15 \div \frac{5}{6}$?	**17.** $7 \div \frac{7}{11}$?
6. $12 \div \frac{3}{4}$?	**12.** $10 \div \frac{2}{3}$?	**18.** $12 \div \frac{12}{13}$?

19. At $\$\frac{5}{8}$ a yard how many yards of flannel can be bought for $6? for $10? for $16? for $24?

20. At $\$\frac{1}{2}$ a gallon how many gallons of molasses can be bought for $6? for $7? for $9? for $11?

21. At $\$\frac{1}{6}$ a can how many ·cans of peas can be bought for $3? for $3\frac{1}{3}$? for $3\frac{1}{2}$?

22. At $\frac{2}{3}$ of a cent a pound how many pounds of scrap-iron can be bought for 20 cents?

23. At $\$\frac{3}{10}$ a pound how many pounds of writing paper can be bought for $12?

24. If a boy earns $\$\frac{3}{4}$ a day, how many days will it take him to earn $9?

25. If a man can build $\frac{5}{8}$ of a rod of wall in 1 day, in how many days can he build 10 rods?

26. If $\frac{2}{3}$ of a barrel of flour is worth $2, what is the value of $\frac{1}{6}$? of $\frac{5}{6}$?

27. If it costs $6 to mow $\frac{2}{3}$ of a field, what is the cost of mowing the whole field?

28. Six is $\frac{2}{3}$ of what number?

29. Philip agreed to pay $\frac{3}{4}$ of the cost of hiring a boat for 2 weeks. If his share was $6, what was the whole cost?

30. What is the quotient of $6 \div \frac{3}{4}$?

Lesson 37.

1. What is the value of $4 \div \frac{2}{3}$? of $\frac{4}{5} \div \frac{2}{3}$?

2. What is the value of $\frac{4}{5} \times \frac{1}{2}$?

3. Is $\frac{2}{3}$ multiplied by $\frac{3}{4}$ the same in value as $\frac{2}{3} \div \frac{4}{3}$?

4. How many yards of cloth at $\$\frac{2}{3}$ a yard can be bought for $\$\frac{8}{10}$?

5. How many pounds of beef at $\$\frac{1}{8}$ a pound can be bought for $\$\frac{3}{4}$?

6. At $\$\frac{1}{3}$ a can how many cans of peas can be bought for $\$\frac{5}{6}$?

7. If Peter can pick a quart of berries in $\frac{2}{5}$ of an hour, how many quarts can he pick in $\frac{3}{4}$ of an hour?

8. If 1 man can slate $\frac{1}{12}$ of a roof in 1 day, how many men can slate $\frac{1}{2}$ of it in 1 day?

9. If Joseph has $\frac{2}{5}$ of a melon, to how many boys can he give $\frac{1}{5}$ of a melon?

10. To how many girls can a cook give $\frac{1}{10}$ of a cake, if she has $\frac{4}{5}$ of a cake?

11. If A owns $\frac{5}{16}$ of a vessel and B owns $\frac{1}{8}$, how many times B's share is A's share?

12. How many pounds of crackers at $\$\frac{1}{4}$ a pound can be bought for $\$2\frac{1}{2}$?

13. How many pounds of coffee at $\$\frac{2}{3}$ a pound can be bought for $\$1\frac{2}{3}$?

What is the quotient of :

14. $\frac{3}{5} \div \frac{4}{5}$?	**20.** $\frac{4}{11} \div \frac{3}{11}$?	**26.** $\frac{1}{5} \div \frac{3}{10}$?
15. $\frac{7}{8} \div \frac{1}{2}$?	**21.** $\frac{7}{12} \div \frac{1}{4}$?	**27.** $\frac{5}{4} \div \frac{3}{10}$?
16. $\frac{3}{7} \div \frac{3}{4}$?	**22.** $\frac{7}{12} \div \frac{2}{3}$?	**28.** $\frac{2}{3} \div \frac{5}{12}$?
17. $\frac{8}{9} \div \frac{4}{9}$?	**23.** $\frac{7}{12} \div \frac{7}{8}$?	**29.** $\frac{5}{9} \div \frac{11}{12}$?
18. $\frac{8}{9} \div \frac{2}{3}$?	**24.** $\frac{9}{16} \div \frac{3}{4}$?	**30.** $\frac{1}{2} \div \frac{7}{16}$?
19. $\frac{7}{10} \div \frac{7}{5}$?	**25.** $\frac{9}{13} \div \frac{3}{4}$?	**31.** $\frac{2}{3} \div \frac{11}{12}$?

Lesson 38.

1. How many halves are there in $1\frac{1}{2}$?

2. What is the quotient of $6 \div \frac{1}{2}$?

3. What then is the quotient of $6 \div 1\frac{1}{2}$?

4. In $2\frac{1}{2}$ how many halves? In $1\frac{1}{4}$ how many fourths?

5. What is the quotient of $\frac{5}{8} \div \frac{1}{4}$?

6. What then is the quotient of $2\frac{1}{2} \div 1\frac{1}{4}$?

7. What is the quotient of $4 \div 2$? of $\frac{4}{5} \div 2$?

8. What is the value of $\frac{6}{7} \div 3$? of $\frac{6}{7} \times \frac{1}{3}$?

9. Is $\frac{5}{8} \div 5$ the same in value as $\frac{5}{8} \times \frac{1}{5}$?

What is the quotient of :

10. $12 \div 1\frac{1}{4}$?	**20.**	$\frac{5}{9} \div 10$?	**30.**	$1\frac{3}{7} \div 2\frac{1}{7}$?
11. $12 \div 1\frac{1}{2}$?	**21.**	$\frac{2}{3} \div 3\frac{1}{8}$?	**31.**	$2\frac{1}{2} \div 1\frac{3}{7}$?
12. $10 \div 1\frac{1}{4}$?	**22.**	$1\frac{3}{8} \div 3\frac{1}{8}$?	**32.**	$1\frac{1}{2} \div 2\frac{1}{10}$?
13. $16 \div 1\frac{3}{8}$?	**23.**	$3\frac{1}{2} \div \frac{3}{8}$?	**33.**	$2\frac{1}{10} \div 1\frac{1}{2}$?
14. $8 \div 1\frac{3}{8}$?	**24.**	$3\frac{1}{2} \div 1\frac{3}{8}$?	**34.**	$2\frac{1}{2} \div 3\frac{3}{4}$?
15. $\frac{5}{8} \div 12$?	**25.**	$1\frac{1}{4} \div \frac{5}{8}$?	**35.**	$1\frac{1}{3} \div 6$?
16. $\frac{2}{3} \div 8$?	**26.**	$3\frac{3}{4} \div 1\frac{1}{2}$?	**36.**	$2\frac{1}{4} \div \frac{1}{3}$?
17. $\frac{3}{5} \div 3$?	**27.**	$4\frac{1}{2} \div 1\frac{1}{2}$?	**37.**	$1\frac{3}{10} \div \frac{1}{2}$?
18. $\frac{3}{5} \div 12$?	**28.**	$2\frac{1}{2} \div 1\frac{3}{4}$?	**38.**	$2\frac{2}{3} \div 2\frac{2}{3}$?
19. $\frac{5}{8} \div 10$?	**29.**	$4\frac{2}{3} \div 3\frac{1}{2}$?	**39.**	$3\frac{1}{8} \div 2\frac{1}{2}$?

40. At $1\frac{1}{2}$ a yard how many yards of cloth can be bought for $3\frac{1}{2}$? for $4\frac{1}{8}$?

41. At $2\frac{4}{5}$ a cord how many cords of pine wood can be bought for $7?

42. At $4\frac{1}{2}$ a ton how many tons of coal can be bought for $18?

43. At $2\frac{2}{3}$ a bushel how many bushels of beans can be bought for $8?

Lesson 39.

1. What is the sum of 1 half and 1 half ? 1 third and 1 third ? $\frac{1}{4}$ and $\frac{1}{4}$? $\frac{1}{5}$ and $\frac{2}{5}$?

2. What is the sum of $\frac{1}{2}+\frac{1}{2}$? $\frac{1}{3}+\frac{2}{3}$? $\frac{1}{4}+\frac{2}{4}$? $\frac{1}{6}+\frac{3}{6}$? $\frac{2}{8}\times\frac{5}{8}$? $\frac{2}{9}+\frac{5}{9}$? $\frac{2}{10}+\frac{2}{10}+\frac{3}{10}$?

What is the sum of :

3. $\frac{3}{8}+\frac{1}{8}+\frac{2}{8}$?	**9.** $\frac{4}{12}+\frac{1}{12}+\frac{7}{12}$?
4. $\frac{2}{4}+\frac{3}{4}+\frac{1}{4}$?	**10.** $\frac{3}{11}+\frac{5}{11}+\frac{1}{11}$?
5. $\frac{1}{8}+\frac{3}{8}+\frac{2}{8}$?	**11.** $\frac{2}{7}+\frac{3}{7}+\frac{3}{7}$?
6. $\frac{5}{8}+\frac{1}{8}+\frac{3}{8}$?	**12.** $\frac{5}{8}+\frac{3}{8}+\frac{1}{8}$?
7. $\frac{3}{7}+\frac{2}{7}+\frac{1}{7}$?	**13.** $\frac{3}{15}+\frac{2}{15}+\frac{5}{15}$?
8. $\frac{6}{10}+\frac{3}{10}+\frac{7}{10}$?	**14.** $\frac{2}{8}+\frac{10}{8}+\frac{11}{8}$?

15. What is the sum of $1\frac{1}{4}+1\frac{3}{4}+2\frac{1}{4}$? $2\frac{1}{4}+\frac{3}{4}+1\frac{3}{4}$?

16. What is the sum of $1\frac{2}{7}+2\frac{3}{7}+3\frac{5}{7}$? $2\frac{7}{10}+5\frac{3}{10}+6\frac{7}{10}$? $1\frac{1}{18}+3\frac{3}{18}+8\frac{8}{18}$?

17. Jane had $\frac{3}{5}$ of a cake and gave away $\frac{2}{5}$. How many fifths had she left ?

18. A man having $\frac{11}{16}$ of a bushel of oats sold $\frac{4}{16}$ of a bushel. How many sixteenths had he left ?

What is the remainder of :

19. $\frac{4}{5}-\frac{3}{5}$?	**23.** $\frac{13}{6}-\frac{11}{6}$?	**27.** $1\frac{2}{13}-\frac{9}{13}$?
20. $\frac{5}{6}-\frac{1}{6}$?	**24.** $1\frac{5}{16}-\frac{3}{16}$?	**28.** $\frac{11}{20}-\frac{7}{20}$?
21. $\frac{7}{8}-\frac{5}{8}$?	**25.** $\frac{11}{24}-\frac{7}{24}$?	**29.** $1\frac{7}{18}-\frac{3}{18}$?
22. $\frac{8}{9}-\frac{2}{9}$?	**26.** $\frac{11}{36}-\frac{5}{36}$?	**30.** $\frac{11}{25}-\frac{7}{25}$?

31. What is the value of $2\frac{5}{6}-2\frac{1}{6}$? $3\frac{4}{5}-1\frac{1}{5}$?

32. What is the value of $3\frac{5}{7}-1\frac{3}{7}$? of $6\frac{5}{9}-2\frac{5}{9}$?

33. What is the value of $\frac{1}{4}+\frac{1}{4}-\frac{1}{4}$? $\frac{1}{3}+\frac{2}{3}-\frac{1}{3}$? $\frac{2}{5}+\frac{4}{5}-\frac{2}{5}$? $\frac{3}{8}+\frac{6}{8}-\frac{5}{8}$? $\frac{2}{9}+\frac{7}{9}-\frac{5}{9}$?

34. What is the value of $\frac{2}{3}-\frac{1}{3}+\frac{1}{3}$? $\frac{3}{8}-\frac{2}{8}+\frac{7}{8}$? $\frac{9}{10}-\frac{3}{10}+\frac{7}{10}$?

Lesson 40.

1. $\frac{1}{2}$ equals how many fourths ?

2. How many fourths are there in $\frac{1}{2} + \frac{1}{4}$?

3. $\frac{1}{3}$ equals how many sixths ?

4. How many sixths are there in $\frac{1}{3} + \frac{1}{6}$?

5. $\frac{1}{2}$ equals how many sixths ?

6. How many sixths are there in $\frac{1}{2} + \frac{1}{3}$?

7. How many sixths are there in $\frac{1}{2} + \frac{2}{3}$? $\frac{2}{3} + \frac{5}{6}$?

8. $\frac{1}{3}$ equals how many twelfths ?

9. $\frac{1}{4}$ equals how many twelfths ?

10. How many twelfths are there in $\frac{1}{3} + \frac{1}{4}$? $\frac{2}{3} + \frac{1}{4}$? $\frac{2}{3} + \frac{3}{4}$? $\frac{5}{6} + \frac{3}{4}$? $\frac{5}{6} + \frac{5}{4}$?

11. How many eighths are there in $\frac{1}{2} + \frac{1}{4}$? $\frac{1}{2} + \frac{3}{4}$? $\frac{1}{2} + \frac{1}{8}$? $\frac{1}{4} + \frac{3}{8}$? $\frac{1}{4} + \frac{1}{2}$? $\frac{1}{4} + \frac{5}{8}$? $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$?

12. How many sixths are there in $\frac{1}{2} + \frac{1}{3} + \frac{1}{6}$? $\frac{1}{2} + \frac{2}{3} + \frac{1}{6}$? $\frac{1}{2} + \frac{2}{3} + \frac{5}{6}$?

13. How many tenths are there in $\frac{1}{5} + \frac{1}{10}$? $\frac{1}{5} + \frac{3}{10}$? $\frac{2}{5} + \frac{3}{10}$? $\frac{2}{3} + \frac{7}{10}$? $\frac{1}{2} + \frac{9}{10}$? $\frac{3}{5} + \frac{9}{10}$? $\frac{1}{2} + \frac{1}{5}$? $\frac{1}{2} + \frac{1}{5} + \frac{1}{10}$?

NOTE. Since we cannot add units that are not alike, fractions that have different denominators must be changed to equivalent fractions of the same denominator before they can be added or subtracted.

14. How many fourths are there in $\frac{1}{2} - \frac{1}{4}$? $\frac{3}{2} - \frac{3}{4}$?

15. How many sixths are there in $\frac{1}{3} - \frac{1}{6}$? $\frac{2}{3} - \frac{3}{6}$?

16. How many twelfths are there in $\frac{1}{3} - \frac{1}{12}$? $\frac{1}{2} - \frac{1}{12}$? $\frac{1}{3} - \frac{1}{12}$? $\frac{1}{4} - \frac{1}{12}$? $1\frac{1}{2} - \frac{3}{4}$? $\frac{7}{12} - \frac{1}{2}$? $\frac{1}{3} - \frac{1}{4}$?

17. How many tenths are there in $\frac{1}{2} - \frac{1}{10}$? $\frac{1}{2} - \frac{3}{10}$? $\frac{7}{10} - \frac{1}{2}$? $\frac{1}{5} - \frac{1}{10}$? $\frac{2}{5} - \frac{7}{10}$? $\frac{9}{10} - \frac{3}{5}$? $\frac{1}{2} - \frac{1}{5}$? $\frac{2}{5} - \frac{1}{2}$?

18. How many sixteenths are there in $\frac{1}{2} - \frac{1}{16}$? $\frac{1}{4} - \frac{1}{16}$? $\frac{1}{8} - \frac{1}{16}$? $\frac{3}{4} - \frac{5}{16}$? $\frac{7}{8} - \frac{7}{16}$? $1\frac{5}{8} - \frac{1}{2}$? $1\frac{3}{8} - \frac{1}{4}$?

Lesson 41.

What is the sum of :

1. $\frac{1}{2}+\frac{2}{3}$?
6. $\frac{1}{2}+\frac{1}{7}$?
11. $\frac{1}{2}+\frac{1}{3}+\frac{1}{4}$?

2. $\frac{1}{8}+\frac{1}{3}$?
7. $\frac{1}{8}+\frac{2}{3}$?
12. $\frac{1}{4}+\frac{1}{3}+\frac{5}{8}$?

3. $\frac{2}{3}+\frac{1}{4}$?
8. $\frac{1}{4}+\frac{1}{8}$?
13. $\frac{1}{2}+\frac{1}{8}+\frac{7}{10}$?

4. $\frac{2}{3}+\frac{1}{3}$?
9. $\frac{3}{4}+\frac{2}{3}$?
14. $\frac{5}{8}+\frac{1}{2}+\frac{5}{16}$?

5. $\frac{2}{3}+\frac{5}{8}$?
10. $\frac{1}{4}+\frac{7}{8}$?
15. $\frac{1}{2}+\frac{2}{7}+\frac{3}{14}$?

16. Philip can hoe $\frac{1}{4}$ of a field in 1 day and James can hoe $\frac{1}{3}$. What part can both hoe in 1 day?

17. Thomas can dig $\frac{2}{7}$ of a ditch in 1 day and Henry can dig $\frac{4}{14}$. What part can both dig in 1 day?

18. Robert caught a trout weighing $\frac{1}{5}$ lb. and George caught one weighing $\frac{3}{4}$ lb. What would both together weigh?

19. From a stick $\frac{7}{13}$ of a foot long $\frac{1}{4}$ of a foot is cut off. What part of a foot is left?

20. Frank was given a sum of money. He spent $\frac{1}{4}$ of it for books, $\frac{1}{5}$ of it for a hat, and $\frac{1}{8}$ of it for car fares. What part of it did he spend?

21. Mary picked $\frac{1}{4}$ of a bushel of blackberries, Sarah $\frac{5}{8}$ of a bushel, and Helen $\frac{5}{16}$ of a bushel. What part of a bushel did they all pick?

22. If a pipe can fill a tank in 6 hours, what part can it fill in 1 hour? If a second can fill the tank in 4 hours, what part of the tank can it fill in 1 hour? What part can both fill in 1 hour?

23. If one pipe can fill a tank in 4 hours and a second can empty it in 5 hours, what part of the tank will be filled in 1 hour, if both pipes are open?

24. What is the weight of a mixture of $\frac{2}{3}$ lb. of alcohol, $\frac{3}{4}$ lb. of linseed oil, and $\frac{1}{2}$ lb. turpentine?

Lesson 42.

What is the remainder of :

1. $1-\frac{2}{8}$? **3.** $1-\frac{5}{8}$? **5.** $1-\frac{5}{12}$? **7.** $1-\frac{9}{15}$?

2. $1-\frac{1}{8}$? **4.** $1-\frac{6}{11}$? **6.** $1-\frac{7}{10}$? **8.** $1-\frac{23}{36}$?

9. To make a whole unit what fraction must be added to $\frac{1}{4}$? $\frac{2}{8}$? $\frac{5}{8}$? $\frac{4}{7}$? $\frac{5}{12}$? $\frac{6}{11}$? $\frac{7}{9}$? $\frac{7}{10}$? $\frac{11}{16}$? $\frac{9}{20}$?

10. What improper fraction is equal to $1+\frac{1}{10}$? $1+\frac{7}{8}$? $1+\frac{6}{11}$? $1+\frac{7}{12}$? $1\frac{5}{16}$? $1\frac{9}{20}$? $1\frac{3}{25}$? $1\frac{11}{36}$?

11. What improper fraction is equal to $2-\frac{1}{8}$? $3-\frac{2}{3}$? $2-\frac{7}{8}$? $4-\frac{3}{4}$? $5-\frac{3}{8}$? $6-\frac{1}{2}$? $3-\frac{4}{9}$? $2-\frac{7}{8}$?

12. How many pounds of beef will be left after $\frac{7}{8}$ lb. are cut from a piece weighing 3 lbs.?

13. A man building a wall finished $\frac{1}{4}$ of it the first day, and $\frac{1}{8}$ of it the second day. What part of the wall was still unfinished?

14. If $\frac{3}{16}$ of a pole is under water and the rest is above water, what part is above water?

15. If $\frac{1}{10}$ of the ice in an ice-house has melted and $\frac{3}{8}$ of it has been sold, what part remains?

16. A and B shingle $\frac{1}{8}$ of a roof in 1 day. A shingles $\frac{1}{8}$ of it, what part does B shingle?

17. A and B can dig a trench in 6 days. What part can they dig in 1 day? If A can dig $\frac{1}{12}$ of it in 1 day, what part can B dig in 1 day?

18. A can mow a field in 5 days. His son can work only half as fast. What part can the son mow in 1 day? What part can both mow in 1 day?

19. If A can dig a ditch in 3 days, B in 4 days, and C in 6 days, what part can the three dig in 1 day? What part will remain at the end of 1 day?

Lesson 43.

Ex. What is the sum of $2\frac{2}{3} + 3\frac{3}{4} + 4\frac{5}{8}$?

Solution : $\frac{2}{3} + \frac{3}{4} + \frac{5}{8} = \frac{8}{12} + \frac{9}{12} + \frac{15}{12} = \frac{27}{12} = 2\frac{1}{4}$.
$2 + 3 + 4 + 2\frac{1}{4} = 11\frac{1}{4}$.

What is the sum of :

1. $1\frac{2}{3} + 3\frac{1}{2}$?	**6.** $3\frac{1}{2} + 2\frac{1}{3} + 1\frac{1}{6}$?
2. $3\frac{2}{3} + 1\frac{9}{10}$?	**7.** $2\frac{1}{4} + 2\frac{5}{8} + 3\frac{1}{2}$?
3. $2\frac{1}{4} + 2\frac{1}{6}$?	**8.** $5\frac{1}{3} + 1\frac{1}{10} + 1\frac{7}{10}$?
4. $2\frac{1}{8} + 3\frac{1}{12}$?	**9.** $7\frac{1}{2} + 5\frac{3}{4} + 4\frac{5}{8}$?
5. $3\frac{3}{4} + 4\frac{5}{8}$?	**10.** $6\frac{2}{3} + 8\frac{5}{8} + 10\frac{1}{4}$?

11. A grocer bought $7\frac{1}{2}$ bu. of potatoes from A, $3\frac{3}{4}$ bu. from B, and $8\frac{2}{3}$ bu. from C. How many bushels did he buy from the three?

12. A coal dealer sold $2\frac{1}{4}$ tons of coal to one man, $4\frac{1}{3}$ tons to a second, and $6\frac{1}{10}$ tons to a third. What was the weight of the three sales?

13. A target for testing cannon was made from a steel plate $1\frac{5}{8}$ ft. thick, with a backing of oak $4\frac{1}{2}$ ft. thick. What was the thickness of the target?

14. If a boy weighing $70\frac{3}{4}$ lb. rides a bicycle weighing $20\frac{2}{3}$ lb., what is the weight of both?

15. A man earns $\$3\frac{2}{3}$ in a day and his son $\$1\frac{1}{2}$ a day. How much do both earn in a day?

16. A plumber worked $7\frac{2}{3}$ hours on Monday and $8\frac{1}{2}$ hours on Tuesday. How many hours did he work?

17. A and B start from the same spot and walk in opposite directions. If A walk $3\frac{2}{3}$ miles an hour and B $2\frac{3}{4}$ miles an hour, how far apart will they be at the end of an hour?

18. What is the sum of 2 ft. 8 in. and 6 ft. 9 in. ?

Lesson 44.

Ex. 1. What is the difference between $2\frac{3}{4}$ and $1\frac{1}{2}$?

Solution : $\frac{3}{4} - \frac{1}{2} = \frac{3}{4} - \frac{2}{4} = \frac{1}{4}$; and $2 - 1 = 1$.   Therefore the difference is $1\frac{1}{4}$.

Ex. 2. What is the difference between $4\frac{3}{4}$ and $2\frac{5}{6}$?

Solution : $4\frac{3}{4} - 2\frac{5}{6} = 4\frac{9}{12} - 2\frac{10}{12} = 3\frac{21}{12} - 2\frac{10}{12} = 1\frac{11}{12}$, Ans.

What is the remainder of :

1.	$3\frac{1}{5} - 1\frac{3}{10}$? ·	**8.**	$6\frac{1}{2} - 4\frac{2}{3}$?
2.	$5 - 2\frac{5}{8}$?	**9.**	$5\frac{2}{3} - 4\frac{3}{4}$?
3.	$6\frac{1}{2} - 3\frac{1}{4}$?	**10.**	$3\frac{5}{18} - 2\frac{7}{8}$?
4.	$7 - 6\frac{3}{7}$?	**11.**	$4\frac{1}{8} - 3\frac{3}{4}$?
5.	$4\frac{5}{8} - 2\frac{1}{4}$?	**12.**	$6\frac{3}{10} - 2\frac{4}{5}$?
6.	$5\frac{3}{4} - 3\frac{5}{8}$?	**13.**	$3\frac{7}{20} - 2\frac{3}{5}$?
7.	$5\frac{5}{8} - 3\frac{3}{4}$?	**14.**	$8\frac{9}{100} - 4\frac{3}{50}$?

15. If $2\frac{3}{4}$ quarts are taken from a gallon of vinegar, how many quarts remain ?

16. If from a piece of cloth containing $16\frac{5}{8}$ yd. $11\frac{1}{2}$ yd. are sold, how many yards are left ?

17. If a man's income is $\$23\frac{1}{2}$ a week and his expenses are $\$18\frac{5}{8}$ a week, how much does he save in a week ?

18. If a man spends $\frac{2}{3}$ of his salary for board and $\frac{3}{10}$ of it for other expenses, what part does he save ?

19. A piece of cloth measured $12\frac{2}{8}$ yd. before sponging and $11\frac{5}{6}$ yd. after sponging. How much did the cloth shrink ?

20. A pipe delivered $16\frac{1}{8}$ gal. into a tank, but $4\frac{1}{2}$ gal. leaked out. How many gallons remained ?

21. Mr. Smith owns 3 small farms containing $8\frac{4}{5}$, $10\frac{1}{2}$, and $12\frac{1}{3}$ acres. How many acres does he own ?

Ex. 1. What fraction of 7 is 3 ?

Solution: Since 1 is $\frac{1}{7}$ of 7, 3 is 3 × $\frac{1}{7}$ of 7, or $\frac{3}{7}$ of 7.

Ex. 2. What fraction of $\frac{1}{2}$ is $\frac{1}{3}$?

Solution: Since $\frac{1}{2} = \frac{3}{6}$ and $\frac{1}{3} = \frac{2}{6}$, $\frac{1}{3}$ is the same part of $\frac{1}{2}$ that 2 is of 3, or $\frac{2}{3}$.

1. What part of a pound are 4 oz. ? 8 oz. ? 6 oz. ?

2. What part of a foot are 9 in. ? 6 in. ? 8 in. ?

3. What part of a yard are 2 ft. ? 1½ ? 2½ ft. ?

4. What part of a yard are 12 in. ? 18 in. ? 8 in. ?

5. What part of a mile are 80 rd. ? 40 rd. ?

6. What part of a gallon are 2 qt. ? 2½ qt. ?

7. What part of a bushel are 8 qt. ? 24 qt. ?

8. What part of an hour are 5 min. ? 10 min. ? 15 min. ? 30 min. ? 45 min. ? 50 min. ?

9. At $20 a ton what part of a ton of hay can be bought for $5 ? $10 ? $15 ? $8 ? $12 ?

10. At $6 a cord, what part of a cord of wood can be bought for $3 ? $4 ? $1½ ?

11. At $7 a ton what part of a ton of coal can be bought for $3½ ? $2½ ? $1¾ ? $8¾ ? $10½ ?

12. How many pounds are there in $\frac{1}{5}$ of 100 lb. ? $\frac{2}{5}$ of 100 lb. ? $\frac{4}{5}$ of 100 lb. ? $\frac{7}{8}$ of 100 lb. ?

13. What fraction of 100 is 12½ ? 37½ ? 62½ ? 87½ ?

14. How many pounds are there in $\frac{1}{12}$ of 100 lb. ? $\frac{1}{6}$ of 100 lb. ? $\frac{1}{3}$ of 100 lb. ? $\frac{2}{3}$ of 100 lb. ?

15. What part of 100 is 8⅓ ? 16⅔ ? 33⅓ ? 66⅔ ?

16. What part of 100 is 20 ? 40 ? 25 ? 75 ? 175 ?

17. If a horse costing $100 was sold at a loss of $16⅔, what part of the cost was the loss ?

Lesson 46.

Ex. Reduce $\dfrac{37\frac{1}{2}}{100}$ to a simple fraction.

Solution: Multiply both terms by 2, and we have $\frac{75}{100}$, which reduced to its lowest terms is $\frac{3}{8}$.

Reduce to a simple fraction in its lowest terms:

1. $\dfrac{16\frac{2}{3}}{100}$ 6. $\dfrac{62\frac{1}{2}}{100}$ 11. $\dfrac{2\frac{1}{2}}{100}$

2. $\dfrac{8\frac{1}{3}}{100}$ 7. $\dfrac{87\frac{1}{2}}{100}$ 12. $\dfrac{3\frac{1}{8}}{100}$

3. $\dfrac{66\frac{2}{3}}{100}$ 8. $\dfrac{6\frac{1}{4}}{100}$ 13. $\dfrac{14\frac{2}{7}}{100}$

4. $\dfrac{83\frac{1}{3}}{100}$ 9. $\dfrac{18\frac{3}{4}}{100}$ 14. $\dfrac{28\frac{4}{7}}{100}$

5. $\dfrac{12\frac{1}{2}}{100}$ 10. $\dfrac{31\frac{1}{4}}{100}$ 15. $\dfrac{11\frac{1}{9}}{100}$

16. A suspended bank pays its depositors at the rate of 66⅔ cents for each dollar deposited. What part of his deposit will each depositor receive?

17. If the average decrease in the value of the machinery of a factory is 12½ cents on a dollar each year, what part is lost each year?

18. If each dollar invested pays a man 8⅓ cents a year, what part of his whole capital invested is returned to him each year?

19. If a vessel is insured so that 33⅓ cents will be paid to the owners for every dollar of cost, for what part of the cost is the vessel insured?

20. If 14²⁄₇ lb. of a mass of metal weighing 100 lb. are copper, what part of the whole is copper?

1. If a yacht sails 6⅔ miles in an hour, how many miles will it sail in ⅘ of an hour ? in 2⅘ hours ?

2. If some plums are divided equally among 7 boys, what part of the whole will 5 boys receive ?

3. A field is 20 rods long and 8 rods wide. How many square rods are there in ₁³₀ of the field ?

4. Mr. Brown sold a carriage for ⅘ of its cost and received $60. What was the cost of the carriage ?

5. 60 is ⅘ of what number ?

6. 42 is ⅞ of what number ?

7. 22 is ¹¹⁄ of what number ?

8. If a pound of copper costs 9¾ cents, what will 2 pounds cost ? ⅔ of a pound ? 2⅔ pounds ?

9. How many 5-cent pieces make ₃⁷₀ of a dollar ?

10. How many pounds of soda will be required to make 30 quarter-pound packages ?

11. If ⅘ yd. of velvet costs $1, what is the cost of 1 yd. ? of 9 yd. ?

12. A man being asked his age replied that he had lived 2¾ score years. How old was he ?

13. If a cubic foot contains ⅘ of a bushel, how many bushels will a bin hold if it is 4 ft. long, 3 ft. wide, and 2½ ft. deep ?

14. How many cubic feet in 12 bu. ? 30 bu. ?

15. If 5 men can hoe a cornfield in 4₁₀ hours, how long will it take 1 man to hoe the field ?

16. If spruce costs $2¼ a cord, what will be the cost of 3⅓ cords ?

17. If a vessel is divided into 16 shares, what part of the vessel belongs to a man owning 3½ shares ?

Lesson 48.

1. A trader sold a load of hay for ⅞ of its cost and gained $6. What was the cost of the load?

2. A and B start from the same place at the same time and walk in the same direction. If B walks 3½ miles per hour and A walks 2¾ miles per hour, how far apart will they be in 1 hour? in 5 hours?

3. In the last example how far apart will they be in 5 hours, if they walk in opposite directions?

4. A floor is 12 ft. long and 8 ft. wide. What is the cost of tiling ¾ of it at $1 per square foot?

5. If it costs $48 dollars to build a fence, what part of the fence can be built for $8? $20? $32?

6. If 12½ cents of every dollar received by a merchant is profit, what part of his receipts is profit?

7. If 20 cents of every dollar received is profit, the gain is what part of the cost?

8. What part of the dial of a clock does the hour-hand move over, while the minute-hand goes once around the dial?

9. What part of the dial will the hour-hand move over while the minute-hand is going ¾ of the distance around the dial?

10. If the minute-hand moves 30 minute spaces, how many does the hour-hand move in the same time?

11. A owns $\frac{3}{20}$ of a factory and B owns ¾ of it. What part of B's share is A's share?

12. If 18 weavers earn $27 in a week, what part of $27 will 4 weavers earn?

13. If a man's wages average $1.66⅔ a day, what part of $1 does he earn in a day?

1. A farmer raised 12¾ tons of hay and sold ¾ of it. How many tons did he sell?

2. A farmer sold ⅘ of his flock of sheep and kept 20 sheep. How many had he at first?

3. If ⅛ of a yard of ribbon costs 16 cents, what is the cost of ⅝ of a yard?

4. A man walked from Boston to New Haven in 8⅓ days. What part of the distance did he walk in 2⅓ days?

5. A can shingle $\frac{3}{16}$ of a roof in a day. How many days will it take him to shingle the roof?

6. B can paint a house in 6⅔ days. What part can he paint in 1 day?

7. A and B can mow a field in 8 hours and A can mow it in 12 hours. How long will it take B working alone to mow the field?

8. If a monthly magazine costs at the rate of 16⅔ cents a copy, what is the cost for 1 year?

9. If a man saves 37½ cents a day, how long will it take him to save $3?

10. If a boy earns $¾ a day and spends $⅝ a day, how much can he save in 12 days?

11. If a unit is divided into 15 equal parts, what name do you give to one part?

12. How many house lots each containing $\frac{7}{12}$ of an acre are there in a field containing 14 acres?

13. A dressmaker in making a dress uses 12⅝ yd. of silk, 6½ yd. of lining material, and 2¼ yd. of velvet. How many yards are used in making the dress?

Lesson 50.

1. What is the cost of $5\frac{1}{4}$ doz. jars at $\$\frac{3}{4}$ a dozen?

2. What part of $\frac{9}{10}$ is $\frac{3}{5}$? of $\frac{3}{5}$ is $\frac{9}{10}$?

3. A man owning $\frac{3}{10}$ of a factory gave his share to his 5 children. If an equal division is made what part of the factory will each child receive?

4. If a man earns $\$1\frac{5}{8}$ a day and his son earns $\$\frac{3}{4}$ a day, how much more will the father earn than the son in 1 day? in 4 days?

5. If C can build a wall in 9 days and D in 7 days, what part can each do in 1 day? in 3 days?

6. A man owning $\frac{3}{4}$ of a ship sells $\frac{3}{5}$ of his share for $4,000. What is the value of the ship?

7. How many feet are there in $\frac{3}{11}$ of a rod?

8. What 7 equal numbers when added give 42? What part of 42 is the sum of 4 of these numbers?

9. If 15 men dig a ditch in 8 days, how long will it take 6 men to dig the ditch?

10. If blueberries are 8 cents a quart, what part of a peck can be bought for 56 cents?

11. Which is the largest and which the smallest of the fractions $\frac{5}{12}$, $\frac{1}{4}$, and $\frac{3}{8}$?

12. If a butcher leaves home in the morning with 100 lb. of beef and returns at night with $12\frac{1}{2}$ lb., what part of his beef has he sold?

13. If a ton of hard coal occupies 32 cu. ft. of space, how many cubic feet are there in $1\frac{1}{4}$ tons?

14. If 7 lb. of pork are sold for $1, how many cents must be paid for 1 lb.?

15. If a quart and a pint are taken from a gallon of vinegar, what part of the gallon remains?

Lesson 51.

1. A sold $4\frac{3}{4}$ acres of land to B, and $9\frac{1}{2}$ acres to C. How many acres did A sell?

2. If $\frac{7}{10}$ of a ton of coal costs \$3.50, what is the cost of 8 tons?

3. From what number must $4\frac{3}{4}$ be subtracted to leave a remainder of $9\frac{1}{2}$?

4. If John walks $9\frac{3}{5}$ miles in $3\frac{1}{5}$ hours, how many miles does he walk in 1 hour?

5. If a man earns \$8$\frac{3}{4}$ in 5 days, how much does he earn in 2 days?

6. How long will it take a boy to earn \$7 if he earns $87\frac{1}{2}$ cents a day?

7. The product of two numbers is $17\frac{1}{2}$. If one number is $3\frac{1}{2}$ what is the other?

8. By what number must $7\frac{1}{4}$ be divided to give $1\frac{3}{4}$ as a quotient?

9. How much greater is $\frac{1}{2}$ of 40 than $\frac{1}{8}$ of 40?

10. If $\frac{1}{8}$ of a number is 5 greater than $\frac{1}{4}$ of the number, what is the number?

11. Mr. Smith sold a cow for \$36, which was $\frac{1}{8}$ more than the cost. What was the cost of the cow?

12. What number increased by $\frac{1}{8}$ of itself is equal to 24? 42? 48? 54? 96?

13. Thomas has 5 times as many cents as Philip. If together they have 42 cents, how many has each?

14. George has $\frac{2}{3}$ as many marbles as Henry and together they have 40 marbles. How many has each?

15. The sum of 2 numbers is 48 and the smaller is $\frac{2}{3}$ of the larger. What are the numbers?

Lesson 52.

1. At $5¼ a ton what part of a ton of coal can be bought for $1½? $3½? $3?

2. Frank caught 3 bass, one of which weighed 2 lb. 14 oz., the second 1 lb. 4 oz., and the third 3 lb. 10 oz. What was the weight of the three fish?

3. What 9 equal numbers added together make 30? What part of 30 is the sum of 5 of these numbers? 3 of these numbers?

4. What is the distance around a room 16¼ ft. long and 10¾ ft. wide?

5. If the sum of the length and width of a room is 30 ft. and the width is ⅔ of its length, what are the dimensions of the room?

6. At 37½ cents a yard how many yards of cloth can be bought for $2? for $5? for $7?

7. A man invests ¼ of his capital in bank stock, ⅓ in railroads, ⅙ in real estate, and has $1000 left. What is the amount of his capital?

8. How many times can a measure holding ⅔ of a pint be filled from a keg containing 2½ gal.?

9. A man bought a pair of gloves for $1¾, a necktie for $½, and 2 collars at $¼ apiece. What change should he receive from $5?

10. One-half of a cord of wood at $6 a cord will pay for what part of a ton of coal at $5⅓ a ton?

11. Mr. Peters sold ½ of his farm, then ⅓ of the remainder. What part of the farm did he keep?

12. If a man's expenses average 62½ cents for every dollar that he earns, what part of his income does he spend? What part does he save?

1. If 3 qt. of cream can be bought for $1, what is the cost of 1½ pt. ?

2. A bushel contains 1¼ cubic feet. How many cubic feet are there in 6 bushels ?

3. If ⅜ of a peck of cranberries costs 27 cents, what is the cost of ½ of a bushel ?

4. If A can build a fence in 3½ days and B in 4⅛ days, what part of the fence can each build in 1 day ?

5. If B can walk 4½ miles an hour and C can ride 15 miles an hour on a bicycle, what part of an hour must C ride to go as far as B can walk in 1 hour ?

6. What is the cost of 6¼ cords of pine wood at $3 a cord ? of 7 cords at $3½ a cord ?

7. How many five-cent pieces make $1⁷⁄₁₀ ?

8. If a sailboat sails 7½ miles in 2½ hours, what is the rate per hour ?

9. How many cubic feet are there in a piece of timber 12 ft. long, 1½ ft. wide, and ⅜ ft. thick ?

10. Assuming that 7½ gal. make a cubic foot of water, what part of a cubic foot of water is 1 gal. ?

11. How many gallons are there in ⅔ of a cubic foot?

12. If a cubic foot of water weighs 62½ lb., what is the weight of 2 cu. ft. ? of ½ cu. ft. ?

13. Joseph and Thomas start from the same place on bicycles. Joseph rides south at the rate of 9⅔ miles per hour. Thomas rides north 11¼ miles per hour. How far apart are they at the end of 1 hour ?

14. If a merchant loses ⅓ of his capital 1 year and ¼ of the remainder the next year, what part of his capital does he lose in the two years ?

1. The sum of 8 equal numbers is $3\frac{2}{3}$? What part of $3\frac{2}{3}$ is the sum of 7 of these numbers?

2. If a passenger train runs from Boston to Portland in $3\frac{3}{4}$ hours, how many hours will it take a freight train running $\frac{2}{3}$ as fast?

3. If a freight train at $\frac{2}{3}$ the rate of an express train runs 48 miles in 2 hours, how long will it take the express train to run the same distance?

4. Two boys are 27 miles apart and walk toward each other, one at the rate of $3\frac{1}{4}$ miles per hour, the other at $3\frac{1}{2}$ miles per hour. What part of the distance will remain at the end of 2 hours?

5. If plums can be bought at the rate of 5 for 3 cents, what part of a dollar would 25 plums cost?

6. If 20 pounds of sugar can be bought for $1, what part of a ton can be bought for $5?

7. If a knife costing $1 is sold for $1.30, the profit is what part of the cost?

8. If the upper surface of a paving block is $\frac{1}{10}$ of a square foot, how many blocks will be needed to pave $8\frac{2}{3}$ sq. ft.?

9. If 16 is $2\frac{1}{2}$ times a number, what part of 16 is the number?

10. If $\frac{1}{6}$ of a stick $\frac{3}{8}$ of a yard long is cut off, what part of a yard is left?

11. If grapes cost $37\frac{1}{2}$ cents a basket, what fraction of a dollar will be left after the cost of 2 baskets is taken from it?

12. How many baskets of grapes at $\frac{3}{8} a basket can be bought for $12?

1. A bankrupt paid 62½ cents on a dollar. What part of his claim did each creditor receive ?

2. A milkman sold the same amount of milk to each of 8 families and sold 5 gal. in all. How many quarts did each family buy ?

3. If a man agrees to work 10 hours a day, what part of a day's wages should he receive for working 3 hours and 45 minutes ?

4. A and B hired a pasture. A put in 8 cows, B 13 cows. What part of the rent should each pay ?

5. A and B are partners. A owns $3000 of the capital and B $8000. What part of the profits should B receive ?

6. A and B divide profits in proportion to their capital. If A receives $500 and B $200, what part of the capital belongs to A ?

7. Thomas earns $2½ a day and George $1½. They work the same number of days and earn together $40. What part of it belongs to George ?

8. If ⅔ of a piece of work can be done in a day, in how many days can the work be done ?

9. If A can mow ⅓ of a field in ½ of a day, in how many days can he mow the field ?

10. A man divided $48 between his 2 sons so that one received ⅛ as much as the other. What part of $48 did each receive ? How many dollars ?

11. John has ⅔ of a melon. To how many boys can he give ₁₃ of a melon ? ⅓ of a melon ?

12. If every dollar pays 4 cents yearly, what part of an investment is repaid to the owner each year?

Lesson 56.

1. A is 12½ miles behind B. In how many hours will he overtake B, if he walks 1¼ miles an hour faster than B ?

2. A freight train runs 18⅘ miles an hour, and an express train runs 35⅔ miles. How many miles does the express gain on the freight in an hour ?

3. What part of a bushel of chestnuts would be needed to give 24 boys a pint apiece ?

4. If a post 5½ ft. high casts a shadow 2 ft. long, what part of the height of the post is the length of its shadow ?

5. How high is a pole that casts a shadow 5 times as long as the shadow of the post in the last example ? 8 times as long ?

6. If a man walks at the rate of 2⅘ miles an hour, how far will he walk in 7 hours ?

7. If A can build a wall in 2¼ days, what part can he build in 1 day ? in 2 days ?

8. If A can mow a field in 2½ days and B can mow it in 2½ days, what part can each mow in 1 day ? What part can both together mow in 1 day ?

9. What will remain of $5 after paying for beef $1¾, for sugar $1¼, and for apples $1½ ?

10. If Mr. Brown sold a horse, losing ⅛ of the cost, for what part of the cost did he sell the horse ? What did the horse cost if he was sold for $70 ?
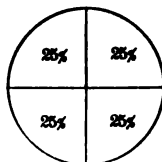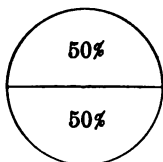
11. By investing $80 B gains $4 a year. C invests $70 and gains $3 a year. What part of his investment is returned to each man in a year ? Which makes the better investment ?

CHAPTER IV.

Lesson 1.

Per cent means *hundredths.* 10% (10 per cent) of anything is 10 hundredths of it.

1. What part of a circle is 50% of it?
2. How many quarts in 50% of 1 gal.?
3. If a boy has 40 cents, how much will he have after spending 50% of his money?
4. 50% of 34 is what number?
5. After selling 50% of his cows a dealer had 15 cows left. How many had he at first?
6. What part of a circle is 25% of it?
7. What part of an apple is 25% of it?
8. How many quarts in 25% of 1 bu.?
9. A farmer sold 25% of his flock of sheep. What part of his flock did he keep?
10. 25% of a mixture is water, and the mixture contains 10 lb. of water. What is the weight of the mixture?
11. A frost killed ¼ of the plants in a garden. What per cent of the plants did the frost kill? What per cent remained alive?

Lesson 2.
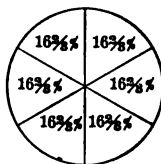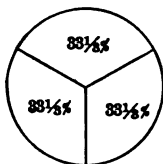
1. What part of a circle is $33\frac{1}{3}\%$ of it ?

2. How many minutes in $33\frac{1}{3}\%$ of 1 hour ?

3. How many dollars in $33\frac{1}{3}\%$ of $36?

4. If a man gave away $\frac{1}{3}$ of his property, what per cent of his property did he give away ?

5. In an orchard of 42 trees $33\frac{1}{3}\%$ are pear trees. How many pear trees are there in the orchard ?

6. What per cent of a circle is $\frac{2}{3}$ of the circle ?

7. A boy having 21 peaches gave away $66\frac{2}{3}\%$ of them. How many peaches did he give away ?

8. How many inches in $66\frac{2}{3}\%$ of a yard ?

9. If a boy lost $\frac{1}{3}$ of his marbles, what per cent of his marbles did he have left?

10. After selling $33\frac{1}{3}$ per cent of his flock of sheep, a farmer had 32 sheep left. How many had he at first ?

11. What part of a circle is $16\frac{2}{3}\%$ of it?

12. If a pie is divided equally among 6 boys, what per cent of the pie will each boy have ?

13. How many eggs in $16\frac{2}{3}\%$ of a dozen of eggs ?

14. Fifty dollars is $16\frac{2}{3}\%$ of what ?

15. A owns $33\frac{1}{3}\%$ of a vessel and B $16\frac{2}{3}$ per cent. A's share is how many times B's share ?

16. Eleven is $16\frac{2}{3}\%$ of what number ?

Lesson 3.

						10%	10%	10%	10%	10%
20%	20%	20%	20%	20%		10%	10%	10%	10%	10%

1. What part of a rectangle is 20% of it?

2. Twenty is what part of 100?

3. If a rectangle contains 40 sq. ft., how many square feet are there in 20% of it? in 40% of it? in 60% of it? in 80% of it? in 100% of it?

4. If a piece of cloth 10 ft. long shrinks 20%, how long will the cloth be after shrinking?

5. Peter's age is 20% of his father's. If Peter is 9 years old, how old is his father?

6. A farmer sold 20% of his land to A, 25% to B, and 50% to C. What per cent had he left?

7. What part of a rectangle is 10% of it?

8. How many square rods in 10% of an acre?

9. How many pounds in 10% of a ton?

10. What part of 20 is 2? What per cent?

11. What per cent of 20 is $\frac{3}{10}$ of 20? $\frac{5}{10}$ of 20? $\frac{7}{10}$ of 20?

12. Philip gave 10% of a melon to each of 4 boys. What per cent of the melon remained?

13. A owns 25% of a factory and B 10%. A's share is how many times B's share?

14. What per cent of a farm would remain after $\frac{7}{10}$ of it was sold?

Lesson 4.

50%	25%	25%
50%	25%	25%

33⅓%	16⅔%	16⅔%	20%		10%	10%
			20%		10%	10%
33⅓%	16⅔%	16⅔%	20%		10%	10%
			20%		10%	10%
33⅓%	16⅔%	16⅔%	20%		10%	10%

1. What per cent of $12 would each boy have, if the money was divided equally among 3 boys? 2 boys? 4 boys? 10 boys? 5 boys? 6 boys?

2. How many seconds in 25% of 1 minute? 50%? 16⅔%? 20%? 33⅓%? 66⅔%? 100%? 10%?

3. What per cent of a ship does a man own, if he owns $\frac{1}{8}$ of it? $\frac{3}{8}$? $\frac{1}{2}$? $\frac{3}{4}$? $\frac{9}{10}$? $\frac{1}{6}$? $\frac{5}{6}$?

4. What per cent of a farm remains after there is sold $\frac{2}{3}$ of it? $\frac{1}{2}$? $\frac{1}{8}$? $\frac{3}{4}$? $\frac{2}{3}$? $\frac{3}{10}$?

5. A man divided his property equally among his children. How many children had he if each received 25% of it? 50%? 16⅔%? 33⅓%? 20%?

6. 16⅔% of an orchard of 48 trees are peach trees, 25% are pear trees, and the rest are apple trees. How many are there of each kind?

7. What is the number of which 12 is 50%? 25%? 75%? 66⅔%? 40%? 60%? 10%? 16⅔%?

8. A owns 50% of a railroad. What part of his share does he sell if he sells 25% of the railroad? 10%? 20%? 16⅔%? 33⅓%? 40%?

9. What per cent of 10 is 1? 1⅔? 2½? 4? 5? 3⅓? 6⅔? 7½? 9? 10?

Lesson 5.

1. $1 is what part of $100 ? $1 is what % of $100 ?
2. $2 is what part of $100 ? $2 is what % of $100 ?
3. $3 is what part of $100 ? $3 is what % of $100 ?
4. $1 is what part of $50 ? $1 is what % of $50 ?
5. $2 is what part of $50 ? $2 is what % of $50 ?
6. $3 is what part of $50 ? $3 is what % of $50 ?
7. $1 is what part of $25 ? $1 is what % of $25 ?
8. $2 is what part of $25 ? $2 is what % of $25 ?
9. $3 is what part of $25 ? $3 is what % of $25 ?
10. $1 is what part of $10 ? $1 is what % of $10 ?
11. $2 is what part of $10 ? $2 is what % of $10 ?
12. $3 is what part of $10 ? $3 is what % of $10 ?
13. $5 is what part of $100 ? $5 is what % of $100 ?
14. $5 is what part of $50 ? $5 is what % of $50 ?
15. $5 is what part of $25 ? $5 is what % of $25 ?
16. $5 is what part of $10 ? $5 is what % of $10 ?
17. $8 is what part of $100 ? $8 is what % of $100 ?
18. $8 is what part of $50 ? $8 is what % of $50 ?
19. $8 is what part of $25 ? $8 is what % of $25 ?
20. $8 is what part of $10 ? $8 is what % of $10 ?
21. $12 is what part of $100 ? $12 is what % of $100 ?
22. $12 is what part of $50 ? $12 is what % of $50 ?
23. $12 is what part of $25 ? $12 is what % of $25 ?
24. $20 is what part of $100 ? $20 is what % of $100 ?
25. $20 is what part of $50 ? $20 is what % of $50 ?
26. $20 is what part of $25 ? $20 is what % of $25 ?
27. $30 is what part of $100 ? $30 is what % of $100 ?
28. $30 is what part of $50 ? $30 is what % of $50 ?
29. $40 is what part of $100 ? $40 is what % of $100 ?
30. $40 is what part of $50 ? $40 is what % of $50 ?

Lesson 6.

1. $6 is what part of $100 ? $6 is what % of $100 ?
2. $6 is what part of $50 ? $6 is what % of $50 ?
3. $6 is what part of $25 ? $6 is what % of $25 ?
4. $6 is what part of $10 ? $6 is what % of $10 ?
5. $10 is what part of $100 ? $10 is what % of $100 ?
6. $10 is what part of $50 ? $10 is what % of $50 ?
7. $10 is what part of $25 ? $10 is what % of $25 ?
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11. $16 is what part of $100 ? $16 is what % of $100 ?
12. $16 is what part of $50 ? $16 is what % of $50 ?
13. $16 is what part of $25 ? $16 is what % of $25 ?
14. $24 is what part of $100 ? $24 is what % of $100 ?
15. $24 is what part of $50 ? $24 is what % of $50 ?
16. $24 is what part of $25 ? $24 is what % of $25 ?
17. $7 is what part of $100 ? $7 is what % of $100 ?
18. $7 is what part of $50 ? $7 is what % of $50 ?
19. $7 is what part of $25 ? $7 is what % of $25 ?
20. $7 is what part of $10 ? $7 is what % of $10 ?
21. $9 is what part of $100 ? $9 is what % of $100 ?
22. $9 is what part of $50 ? $9 is what % of $50 ?
23. $9 is what part of $25 ? $9 is what % of $25 ?
24. $9 is what part of $10 ? $9 is what % of $10 ?
25. $11 is what part of $100 ? $11 is what % of $100 ?
26. $11 is what part of $50 ? $11 is what % of $50 ?
27. $11 is what part of $25 ? $11 is what % of $25 ?
28. $35 is what part of $100 ? $35 is what % of $100 ?
29. $35 is what part of $50 ? $35 is what % of $50 ?
30. $45 is what part of $100 ? $45 is what % of $100 ?

1. 12 bushels are what part of 100 bushels? 12 bushels are what % of 100 bushels?

2. 12 quarts are what part of 50 quarts? 12 quarts are what % of 50 quarts?

3. 12 pints are what part of 25 pints? 12 pints are what % of 25 pints?

4. 6 grains are what part of 100 grains? 6 grains are what % of 100 grains?

5. 6 ounces are what part of 50 ounces? 6 ounces are what % of 50 ounces?

6. 6 pounds are what part of 25 pounds? 6 pounds are what % of 25 pounds?

7. 7 dozen are what part of 100 dozen? 7 dozen are what % of 100 dozen?

8. 7 gross are what part of 50 gross? 7 gross are what % of 50 gross?

9. 7 reams are what part of 25 reams? 7 reams are what % of 25 reams?

10. 10 feet are what part of 100 feet? 10 feet are what % of 100 feet?

11. 10 inches are what part of 50 inches? 10 inches are what % of 50 inches?

12. 10 lines are what part of 25 lines? 10 lines are what % of 25 lines?

13. 5 tons are what part of 100 tons? 5 tons are what % of 100 tons?

14. 5 cords are what part of fifty cords? 5 cords are what % of 50 cords?

15. 5 acres are what part of 25 acres? 5 acres are what % of 25 acres?

Lesson 8.

1. $5 is what part of $75 ? $5 is what % of $75 ?

2. $5 is what part of $55 ? $5 is what % of $55 ?

3. $5 is what part of $35 ? $5 is what % of $35 ?

4. $5 is what part of $15 ? $5 is what % of $15 ?

5. 3 is what part of 100 ? $3 is what % of $100 ?

6. 11 is what part of 100 ? $11 is what % of $100 ?

7. 12 is what part of 100 ? $12 is what % of $100 ?

8. 15 is what part of 100 ? $15 is what % of $100 ?

9. 27 is what part of 100 ? $27 is what % of $100 ?

10. 33 is what part of 100 ? $33 is what % of $100 ?

11. 3 is what part of 4 ? $3 is what % of $4 ?

12. 5 is what part of 10 ? $5 is what % of $10 ?

13. 2 is what part of 8 ? $2 is what % of $8 ?

14. A man having $100 spent $10, what % of his money did he spend ?   What part of 100 is 10 ?

15. A boy who had 10 cents gave away 3 cents, what % of his money did he give away ?

16. A little girl had 5 coppers ; she lost one and gave away two, what % of the money did she have left ?

17. In an orchard of 100 trees there are 11 pear trees, what % of the orchard are pear trees ?

18. On a ship the officers and men number 25 and the passengers 5 ; what % of the persons on the ship are passengers ?

19. 18 students tried an examination and 9 failed to pass, what % of those who tried failed ?

20. 3 dozen eggs were sent to market, but 1 dozen was broken on the way ; what % was broken ?

21. A man has $40. If he spends 60% of his money, what per cent will he have left ?

1. A man with $100 spent $17 for provisions and $8 for a coat; what per cent of his money did he spend?

2. James paid 5 cents for a top and 1 cent for a top-string, and had 4 cents left; what per cent of his money did he spend?

3. Sarah had 5 oranges and gave away 2 of them; what per cent did she give away?

4. In a certain school there were 16 boys and 34 girls; what per cent of the total number of scholars were boys? What per cent girls?

5. A furnace burns 8 tons of coal while a large stove burns 2 tons; what per cent of the coal burned by both is consumed by the stove? What per cent by the furnace?

6. In a certain factory there are employed 20 men, 60 women, 12 boys, and 8 girls. What per cent of the employed are men? women? boys? girls?

7. On a steamship there are 150 First Cabin passengers, 150 Second Cabin, and 200 Steerage; what per cent of all the passengers are Steerage?

8. In a certain school there are 10 teachers; 5 teach languages, 2 teach mathematics, and 3 teach history; what per cent teach languages? what per cent mathematics? what per cent history?

9. Julia can do $\frac{3}{4}$ of her sewing in 1 day; what % of her sewing can she do in 1 day?

10. $33\frac{1}{3}$ is what % of $100?

11. $33\frac{1}{3}$ is what % of $50? $66\frac{2}{3}$ is what % of $100? $66\frac{2}{3}$ is what % of $200?

Lesson 10.

1. How many bushels are 50% of 100 bushels?
2. How many sheep are 40% of 120 sheep?
3. How many pounds are 30% of 150 pounds?
4. How many apples are 3% of 300 apples?
5. How many cords are 50% of 50 cords?
6. How many chairs are 40% of 40 chairs?
7. How many horses are 30% of 50 horses?
8. How many pecks are 3% of 150 pecks?
9. How many rods are 60% of 80 rods?
10. How many feet are 10% of 250 feet?
11. How many yards are 6% of 500 yards?
12. How many barrels are 10% of 30 barrels?
13. A man had 50% of his money invested in real estate, 25% invested in bonds, and the remainder, $5000, in a bank; how many dollars had he?
14. 5000 is 25% of what number?
15. A man bought a horse for $100 and sold him again for $125; how many dollars did he gain? What per cent of the cost did he gain?
16. A man bought a cow for $50 and sold her again for $40, how many dollars did he lose? What per cent of the cost did he lose?
17. A man bought a horse for $200 and sold him again for $240, after keeping him for 5 weeks at a cost of $4 per week; what per cent of the cost did the man gain?
18. A man bought a house for $2500 and sold it for $3000; what per cent of the cost did he gain?
19. A man bought a house for $2500 and sold it for $2000; what per cent of the cost did he lose?

1. A shop-keeper had 75 yards of silk and sold 25 yards; what per cent of his silk did he sell?

2. Two men hired a pasture for $100; one put in 7 horses, and the other 3 horses; what per cent of the $100 ought each to pay?

3. Two men bought a house for $2500; one paid $1500, the other $1000; what per cent of the house does each own?

4. A rod of iron, when heated, increased in length by 1 inch; if the length of the rod, before heating, was 100 inches, by what per cent of its original length has it increased in length?

5. A piece of iron weighs 7 ounces in air, but when weighed in water, its weight is only 6 ounces; what per cent of its weight in air has the piece of iron lost by being weighed in water?

6. Out of an army of 10,000 men, 3000 were killed in a battle; what per cent of the men were killed?

7. A small bank had $50,000 in deposits; $10,000 were deposited by persons living out of town; what per cent of the deposits belonged to persons living in town?

8. To pay the annual expenses of a certain school, $30,000 are required, while to pay those of another school only $20,000 are necessary; what per cent of the larger sum is the difference? what per cent of the smaller sum is the difference?

9. A man worked 4 days out of 6; what was the per cent of time that he was idle?

10. What per cent of 5 is 3? of 3 is 2?

Lesson 12.

1. A merchant bought 30 barrels of flour for $100, and sold the flour at $4.50 per barrel. How many dollars did he gain? How much per cent?

2. Borrowed $2000 at 5%, and with this sum bought goods which were sold at the end of a year for $2300. If $100 was paid for insurance, storage, etc., what per cent on the first cost was gained?

3. James bought 5 doz. oranges for $2. A dozen and a half spoiled, but he sold the remainder for 4 cents apiece; what per cent of the cost did he lose?

4. George bought 3 doz. oranges for 75 cents and sold them at 3 cents apiece; how many cents did he gain? What per cent of the cost did he gain?

5. Bought shoes at $3 per pair and sold them at $3.75; what per cent was gained?

6. Bought hats at $2 each and sold them at $1.75; how many cents were lost on each hat? What per cent of the cost was lost?

7. A man bought a horse for $100 and sold him for $112; what per cent of the cost did he gain?

8. A man bought a horse for $200 and sold him at a price by which he lost 10% of the cost; at what price did the man sell the horse?

9. A grocer sold flour, for which he paid $3.50 per barrel, at an advance of 20%; at what price per barrel did he sell the flour?

10. A young man bought a watch for $20 and sold it so as to gain 5%; at what price did he sell it?

11. A man bought a wagon for $100 and sold it for $90; what per cent of the cost did he lose?

Lesson 13.

1. A lawyer, as agent, borrows $2000, what is his commission at 2% ?

2. A commission merchant sells wheat to the amount of $3000 ; what is his commission at 2% ?

3. A broker sells stock for $5000; what is his commission at ¼ of 1% ?

4. What is the commission on $300, at 2½% ?

5. If I allow a man 5% for collecting sums of money due me, how many dollars must I pay him for collecting $250 ?

6. A gentleman sold 10 shares in the Home Insurance Company at 6% advance, the par value of a share being $100 ; how many dollars did he receive ?

7. Bought 8 shares of a certain railroad at 2% discount, the par value of the stock being $100 ; how many dollars did the stock cost ?

8. A farmer sent to a commission merchant farm produce, which the merchant sold for $75, and charged a commission of 3% ; how many dollars did the farmer receive ?

9. A man borrowed $600 through a broker who asked 2% commission ; how many dollars did the borrower pay the broker for commission ?

10. If a man allows his agent 3% for disbursing $1500, on his account, how many dollars does the agent's commission amount to ?

11. A merchant sent $10,000 to his agent in Havana for the purchase of sugar; if the agent's commission is 1% of the sum sent, how many dollars does he invest in sugar ?

Lesson 14.

1. What is the cost of insuring a vessel in the sum of $10,000 at 3%?

2. The rate of insurance for vessels coasting in Long Island Sound is 4% per annum; what is the annual premium for insuring a schooner for $5000 ?

NOTE. Money paid for insurance is called the *premium* of insurance.

3. A house, worth $2500, is insured for ⅔ of its value at ⅔ of 1%; what is the premium?

4. Mr. Smith buys a house for $12,000, and gets it insured for ¾ of its value at ½ of 1%; this house is burned; what is Mr. Smith's loss ? What is the loss of the Insurance Company ?

5. What is the premium, at 2%, for insuring a steamship cargo from New York to Liverpool, if the cargo, worth $100,000, is insured for ¾ of its value ?

6. A business man insures his office furniture for $300 at 1½%; what is the premium ?

7. The machinery of a factory, worth $10,000, is insured for ½ its value at 3%; what is the premium ?

8. A man insures his goods for $500 at 2½%; what premium does he pay ?

9. A man insured his dwelling house for $2500 at 1½%; what premium does he pay ?

10. A writer insures his books for $800 at ¾ of 1%; what is the premium ?

11. A merchant insures his stock, worth $25,000, for ⅔ of its value ; what is the premium at 2% ?

12. What is the premium, at ⅔ of 1%, for insurance of $500 on household furniture ?

Lesson 15.

1. At the rate of 6% per annum, what is the interest for one year on $100? $200? $300? $400?

2. At the rate of 5% per annum, what is the interest for one year on $400? $500? $600? $700.?

3. At the rate of 4% per annum, what is the interest for one year on $100? $200? $300? $400?

4. At the rate of 3% per annum, what is the interest for one year on $400? $500? $600? $700?

5. At the rate of 6% per annum, what is the interest for two years on $100? $200? $300? $400?

6. At the rate of 5% per annum, what is the interest for two years on $300? $400? $500? $600?

7. At the rate of 4% per annum, what is the interest for two years on $100? $200? $300? $400?

8. At the rate of 3% per annum, what is the interest for two years on $300? $400? $500? $600?

9. At the rate of 6% per annum, what is the interest for three years on $100? $200? $300? $400?.

10. At the rate of 5% per annum, what is the interest for three years on $100? $200? $300? $400?

11. At the rate of 4% per annum, what is the interest for three years on $300? $400? $500? $600?

12. At the rate of 3% per annum, what is the interest for three years on $100? $200? $300? $400?

13. At the rate of 6% per annum, what is the interest for one year on $50? $60? $80? $90? $120?

14. At the rate of 5% per annum, what is the interest for one year on $50? $60? $80? $90? $120?

15. At the rate of 4% per annum, what is the interest for one year on $80? $90? $120? $150? $180?

Lesson 16.

1. At what rate per cent must $100 be put on interest to gain $6 in one year?

2. At what rate per cent must $50 be put on interest to gain $3 in one year?

3. At what rate per cent must $25 be put on interest to gain $1.50 in one year?

4. At what rate per cent must $100 be put on interest to gain $5 in one year?

5. At what rate per cent must $50 be put on interest to gain $2.50 in one year?

6. At what rate per cent must $25 be put on interest to gain $1.25 in one year?

7. At what rate per cent must $100 be put on interest to gain $4 in one year?

8. At what rate per cent must $50 be put on interest to gain $2 in one year?

9. At what rate per cent must $25 be put on interest to gain $1 in one year?

10. At what rate per cent must $100 be put on interest to gain $3 in one year?

11. At what rate per cent must $50 be put on interest to gain $1.50 in one year?

12. At what rate per cent must $25 be put on interest to gain $0.75 in one year?

13. At what rate per cent must $100 be put on interest to gain $10 in two years?

14. At what rate per cent must $200 be put on interest to gain $16 in two years?

15. At what rate per cent must $50 be put on interest to gain $3 in two years?

Lesson 17.

1. For what time must $100 be on interest at 6%
a year to gain $36 ?

2. For what time must $50 be on interest at 5%
a year to gain $5 ?

3. For what time must $200 be on interest at 4%
a year to gain $24 ?

4. For what time must $300 be on interest at 6%
a year to gain $48 ?

5. For what time must $10,000 be on interest at
3% a year to gain $90 ?

6. For what time must $500 be on interest at 4%
a year to gain $40 ?

7. For what time must $350 be on interest at 5%
a year to gain $35 ?

8. For what time must $16 be on interest at 6%
a year to gain $1.92 ?

9. For what time must $45 be on interest at 4%
a year to gain $1.80 ?

10. For what time must $24 be on interest at 5%
a year to gain $3.60 ?

11. For what time must $8 be on interest at 7%
a year to gain $1.12 ?

12. For what time must $80 be on interest at 3%
a year to gain $7.20 ?

13. For what time must $33 be on interest at 8%
a year to gain $2.64 ?

14. For what time must $150 be on interest at
4% a year to gain $24 ?

15. For what time must $900 be on interest at
5% a year to gain $90 ?

Lesson 18.

1. What principal, at 6%, will gain $6 in one year ?
2. What principal, at 5%, will gain $5 in one year ?
3. What principal, at 4%, will gain $4 in one year ?
4. What principal, at 3%, will gain $3 in one year ?
5. What principal, at 6%, will gain $12 in one year ?
6. What principal, at 5%, will gain $15 in one year?
7. What principal, at 3%, will gain $12 in one year?
8. What principal, at 4%, will gain $40 in one year ?
9. What principal, at 5%, will gain $10 in 2 years ?
10. What principal, at 4%, will gain $60 in 3 years ?
11. What principal, at 6%, will gain $120 in 2 years ?
12. What principal, at 8%, will gain $24 in 2 years ?
13. What principal, at 4%, will gain $24 in 2 years ?
14. What principal, at 3%, will gain $18 in 3 years ?
15. What principal, at 7%, will gain $14 in 4 years ?
16. What principal, at 6%, will gain $27 in 3 years ?
17. What principal, at 5%, will gain $100 in 2 years?
18. What principal, at 4%, will gain $80 in 5 years ?
19. What principal, at 8%, will gain $8 in 2 years ?
20. What principal, at 4%, will gain $1.60 in 2 years ?
21. What principal, at 10%, will gain $50 in 5 years ?
22. What principal, at 2%, will gain $18 in 2 years ?
23. What principal, at 5%, will gain $30 in 6 years ?
24. What principal, at 6%, will gain $48 in 2 years ?
25. What principal, at 3%, will gain $18 in 3 years ?
26. What principal, at 4%, will gain $400 in 2 years ?
27. What principal, at 6%, will gain $300 in 2 years ?
28. What principal, at 6%, will gain $3 in 2 years ?
29. What principal, at 4%, will gain $2 in 2 years ?
30. What principal, at 4%, will gain $200 in 2 years ?

Lesson 19.

1. What is the annual income from an investment of $200 at the rate of 5% a year?

2. At the rate of 4% a year, what is the annual interest return from an investment of $1200?

3. In a savings bank a man has a deposit of $350; at the rate of 4% what will the man receive for interest at the end of the year?

4. What is the interest on $42 for one year at 4%? at 5%? at 6%?

5. A man, having $30,000 invested at the rate of 5%, saved 33⅓% of the income; how many dollars did he save per year?

6. A man hires $1000 at 5%, and loans the money at 6%; how many dollars does he gain per year?

7. A man loaned $50 at 6%, $300 at 5%, and $100 at 4%; how many dollars a year does he receive from these loans?

8. A business man borrowed $1200 at 6% and invested the money in such a way as to yield him 15%; how many dollars did he gain in a year?

9. What is the interest at the rate of 5% per annum on $100 for six months?

10. What is the interest at the rate of 4% per annum on $50 for one year and six months?

11. What is the interest at the rate of 3% per annum on $200 for three years and four months?

12. What is the interest at the rate of 6% per annum on $25 for two years and six months?

13. What is the interest at the rate of 5 % per annum on $500 for four months?

CHAPTER V.

Lesson 1.

1. A man bought a sleigh for $20, and gave $9 to have it repaired and painted; then he sold it for $35; how many dollars did he gain?

2. By going on an errand James earned 10 cents; with the money he bought apples at 3 for 2 cents; how many apples did he buy?

3. A man bought a hat for $3, a pair of shoes for $5, and a pair of gloves for $2. He handed the salesman a twenty-dollar bill; how many dollars should the salesman give back?

4. How many oranges can be bought for 25 cents, when they are selling at the rate of 2 for 5 cents?

5. Which is the greater, $\frac{1}{5}$ or $\frac{1}{7}$? $\frac{1}{2}$ or $\frac{1}{10}$? $\frac{1}{8}$ or $\frac{1}{2}$? $\frac{1}{6}$ or $\frac{1}{11}$? $\frac{1}{5}$ or $\frac{1}{13}$?

6. 2 is $\frac{1}{5}$ of what number? $\frac{1}{8}$ of what? $\frac{1}{7}$ of what? $\frac{1}{10}$ of what? $\frac{1}{12}$ of what? $\frac{1}{15}$ of what?

7. George and Harry went nutting. George gathered $\frac{5}{12}$ and Harry $\frac{1}{8}$ of a bushel of hickory nuts; how many more twenty-fourths of a bushel did George gather than Henry?

8. George's uncle gave him $125. George spent $\frac{4}{5}$ of this sum for a bicycle; how many dollars did he have left?

9. Which is the greater, $\frac{5}{7}$ of 42 or $\frac{6}{7}$ of 42? $\frac{4}{5}$ of 35 or $\frac{4}{7}$ of 35?

Lesson 2.

1. A flour merchant gave at Christmas 10½ barrels of flour to his men, giving ½ barrel to each man; how many men were there?

2. In 12⅔ how many thirds? In 16⅚ how many sixths? In 20½ how many eighths? In 25⅘ how many fifths?

3. At Christmas Rollo's uncle George gave him $2 to spend in any way he liked; Rollo bought a copy of Robinson Crusoe for $1, and spent ⅔ of the money that remained for candy; after buying the candy, how much money did Rollo have?

4. At ¼ dollar per yard how many yards of cloth can be bought for $8½?

5. Under the boiler of a steam engine are burned each day 2½ tons of coal; how many tons will be burned in 7 days?

6. Find ½ of 100, ¼ of 100, ⅓ of 100, ⅔ of 100, ⅖ of 100, ⅙ of 100, $\frac{1}{12}$ of 100, $\frac{1}{15}$ of 100.

7. Three tons of coal are distributed equally among 12 poor families; what part of a ton does each family receive?

8. If a man receives $5 for 4 days' work, how much does he receive per day?

9. Three men paid in equal shares $125 for a horse, and paid $3 a week for keeping him; at the end of 5 weeks they sold him for $130; how much did each man lose by the transaction?

10. A merchant bought a piece of cloth for $24, and sold it for ⅚ of what he gave for it; how many dollars did he sell it for?

Lesson 3.

1. A young lady bought a hat for $6, a veil for ½ dollar, and 2 hat pins for ¼ dollar. She handed the saleswoman a ten-dollar bill; how much money did the young lady receive in change?

2. Stephen's father gave him the use of a piece of ground. Stephen planted ⅓ with potatoes, ⅑ with parsnips, and 7/27 with celery. How many twenty-sevenths were left to plant with corn?

3. A merchant bought 1/64 of a ship, and some time afterwards bought 1/32 of the same ship; how many sixty-fourths of the ship did he own?

4. If 4 tons of coal cost $26, what will be the cost of 10 tons?

5. James is twice as old as John, and the sum of their ages is 9 years; what is John's age?

6. A certain sum of money will support a family of 6 persons for 12 weeks; how many persons will it support for 18 weeks?

7. George had $1: he spent ⅗ of it for fish-hooks and a line, and the remainder for a bait-box; how many cents did he pay for the bait-box?

8. At Christmas a poor woman received from one person ⅔ of a ton of coal, from another ⅚, and from a third ¾; how much did she receive in all?

9. If a horse eats 3/16 of a bushel of oats in 1 day, how many days will it take him to eat 1 bushel?

10. If oats cost ⅗ of a dollar a bushel, what will 6 bushels cost?

11. A boy gave 4 other boys ⅗ of an orange apiece; how many oranges did it take?

Lesson 4.

1. Mary having $5⅔, paid $4⅓ for a hat, and the rest for gloves; what was the price of the gloves?

2. From 8⁴⁄₇ take 5⁴⁄₇; from 7¼ take 3⅜.

3. A lady went to a store with $20 and bought a hat for $6⅓, a fan for $1½, gloves for $1¾, and boots for $5⅜; how much money had she left?

4. A contractor, on Saturday night, paid out $100: to the mason he paid $25⅔, to the carpenter $18; what sum was paid for lime, sand, and lumber, the bill for which was settled with the remainder of the $100?

5. Three men buy a sailing vessel; the first buys ½, the second ⅛, and the third the remainder; what part of the vessel did the third man buy?

6. Fred wished to buy a tool chest worth $10. After he had earned $7⅝, his mother made up the remainder; what did she give him?

7. A milliner made 3 hats; into the first she put ¾ of a yard of ribbon, into the second ⅔ of a yard, into the third ½ of a yard. How many yards of ribbon were put into the 3 hats?

8. A sea-captain gave ½ of a ship to his son, ⅜ to his daughter, and the remainder to his wife; what was the wife's share?

9. Henry has $75⅔; how much more money does he need to buy a typewriter valued at $100?

10. A ship's crew of 15 men has provision for 3 months; how many months will it last 1 man?

11. A man gave 25 cents for his breakfast, which was ⅝ of what he gave for his dinner; what did he give for his dinner?

Lesson 5.

1. A man paid $8⅔ for fare, $3¼ for hotel bill, and $1¼ for carriage hire; what was the whole outlay?

2. A sea-captain owning ⅓ of a ship, bought from his brother $\frac{1}{33}$, and from his sister $\frac{3}{84}$ of the same ship; what part of the ship did he then own?

3. A gentleman is 60 years old, and $\frac{7}{33}$ of his age is ⅘ of his wife's age; how old is his wife?

4. George had some money, and received ⅓ as much from his father, which made the entire sum $30; how much had he at first?

5. A man sold a watch for $27, which was ⅞ of what it cost him; how much did he gain?

6. Frank gave $24 for a chain, and paid for a watch 2½ times as much as he paid for the chain; how much did the watch cost?

7. Stephen earns $3⅔, and Samuel $4⅜ in a week; how much will both earn in 1 week? In 4 weeks?

8. Harriet having 12 collars to make, has finished ⅔ of them; how many has she yet to finish?

9. A cook-stove burns ⅔ of a ton of coal in a month, and a furnace burns 9 times that amount; how many tons does the furnace burn in a month?

10. How many gallons of water will a crew of 12 men use in 20 days, if each man on the average uses ⅔ of a gallon a day?

11. George has ⅔ of a bushel of walnuts, and gives ½ of them to Eugene, and ¼ of them to Richard; what part of a bushel does George give to each of his friends?

1. A man owning 15 acres of land gives $\frac{1}{8}$ to his wife, $\frac{1}{5}$ to each of his 3 daughters, and the rest to his son; how many acres does each receive?

2. When potatoes are worth 1\frac{1}{2}$ a barrel, what must be paid for $\frac{1}{3}$ of a barrel?

3. A boy with $\frac{1}{2}$ of a peck of chestnuts gives $\frac{1}{2}$ of them to his mother, and $\frac{1}{3}$ as many to his brother; what part of a peck does the brother receive?

4. Samuel has 60 cents, $\frac{1}{2}$ of which he spends for candy and $\frac{1}{8}$ of the remainder for a top; how much does he pay for the candy and the top?

5. A man owns a half-interest in a certain company, and gives his son $\frac{1}{5}$ of his share; what part of the whole interest does the son receive?

6. On a half-holiday Fritz gathered $\frac{4}{5}$ of a bushel of beech-nuts, while Hans gathered only $\frac{2}{3}$ of that quantity; how many bushels did both gather?

7. A man puts $\frac{1}{5}$ of a car load of potatoes into 2 bins; if he puts the same quantity in each bin, what part of a car load is put into each bin?

8. $\frac{1}{5}$ of a car load of potatoes just fills 2 bins; if one bin holds twice as much as the other, what part of a car load is in each bin?

9. If a horse travels $\frac{7}{13}$ of a mile in 5 minutes, what distance will he go in 1 minute?

10. When 3 bushels of apples cost $2, what must be paid for 8 bushels?

11. A carpenter uses $3\frac{2}{5}$ bunches of shingles for the roofs of 3 dormer-windows; how many bunches will be required to cover 7 such roofs?

Lesson 7.

1. A man buys a box of 200 oranges for $3 and sells them at the rate of $¼ a dozen ; how much does he gain on each dozen ?

2. A coasting schooner carries 200 tons of coal at $¾ a ton ; what is the freight on the coal ?

3. A gentleman left by will $\frac{1}{16}$ of a ship to be equally divided among his five sons ; what part of the ship did each receive ?

4. How many yards of carpet at $¾ per yard can be bought for $3¾ ?

5. When kerosene is 12½ cents a gallon, how many gallons can be bought for $1 ?

6. A grocer gives 18 pounds of sugar for $1; what is the price per pound ?

7. A cubic foot of water weighs 1000 ounces and a cubic foot of- mercury weighs 13,600 ounces ; how many times the weight of the water is the weight of the mercury ?

8. A man received $2¼ per day, and a boy $1¼ per day ; when the work was finished, they together received $7 ; how many days did they work ?

9. A baker uses every day 4⅔ barrels of flour ; how long will 22 barrels last ?

10. A man can do ½ of a piece of work in 1 day, and a boy can do ⅓ of it in 1 day ; how many days will it take each alone to do it ?

11. A mason saves every month $7⅔, and a carpenter $8¼ ; what is the sum of their savings ?

12. At 50 cents a " cut " what will it cost to saw each stick in a cord of wood into 3 pieces ?

Lesson 8.

1. A coat costs $40, a hat $3, and a pair of shoes $5½. How much will be left of $50 after paying for the above named articles ?

2. A freight-train running 15 miles an hour is 48 miles in advance of an express-train running 31 miles per hour; in how many hours will the express overtake the freight-train ?

3. From a gallon of molasses a cook uses ¾ of a gallon, and ⅓ of the remainder leaks away; how much molasses remains ?

4. A tug-boat burns 2⅛ tons of coal per day. If the coal costs $4½ per ton, how much will it cost to run the boat for 6 days ?

5. A steamer sails due south at the rate of 15¾ miles per hour; a brig starting at the same time and from the same place as the steamer sails due north at the rate of 9⅔ miles per hour ; how far apart will the two vessels be at the end of 1 hour ?

6. After 4⅔ years Robert will be 15 years old; what is his present age ?

7. A man hired 4 men and at the end of a week paid $60 to them ; to the first he gave $15, to the second ⅔ of the remainder, to the third $8 ; how many dollars did he give the fourth man ?

8. A man having some wheat gave it to 6 poor persons, giving each ¾ of a bushel; how many bushels did he distribute?

9. How much cloth at $1¾ per yard can be bought for $9 ? for $10 ? for $12 ? for $16? for $18 ? for $21 ? for $28 ? for $49 ? for $56 ?

Lesson 9.

1. A farmer exchanged 8 pounds of butter, worth $¼ per pound, for 3 pounds of tea at $⅔, and some sugar; what was the value of the sugar received?

2. George has $½; his father gives him ½ of that amount, and his mother enough to make up $1; what part of $1 does his mother give him?

3. A lady used ⅔ of a roll of carpeting for her drawing-room, ¼ for her music-room, and the rest, 12 yards, for her study; how many yards in the roll? How many yards were used for the drawing-room?

4. How many yards of carpeting 3 feet wide will it take to carpet a room 30 feet long by 20 feet wide if the strips run across the room?

5. A lady buys 5 yards of lace at $1¼ per yard, 10 yards of muslin at $1 per yard, and pays $1¼ for trimmings; how many dollars does she spend?

6. A gentleman sold some railway stock for $320 and gave ½ of this sum to his daughter, ¼ of the remainder to his niece, and the remainder to his son; how many dollars did each receive?

7. How many barrels each holding 2½ bushels will be required to hold 10 bushels of potatoes?

8. What is the difference in cost between 6 yards of lace at $1¼ per yard and a barrel of flour at $5¼?

9. If a man spends $1¾ a day, how many dollars will he spend in 7 days?

10. How many one-ounce bullets can be made from 5¼ pounds of lead?

11. When zinc is worth 6 cents a pound, how many pounds can be bought for $1½?

Lesson 10.

1. A man's house lot is 50 feet wide and 70 feet deep ; how many square feet in the lot ?

2. A piece of cloth is 5 yards long and 1 yard wide ; how many square feet of cloth in the piece ?

3. A pane of glass is 10 inches long and 8½ inches wide ; how many square inches in the pane ?

4. When potatoes are worth $¾ a bushel, what part of a dollar is a peck worth ?

5. If a family consumes 2 pounds 3 ounces of meat in a day, how much will the family consume in a week ?

6. A schooner carries 250 tons of coal at $1 per ton from New York to Portsmouth ; if $50 is deducted for wharfage and the captain receives ⅖ of the remainder, what sum will the owners of the schooner receive ?

7. How many square feet in a board 5 feet long and 2½ feet wide ?

8. How many cubic feet in a pile of earth 8 feet long, 4 feet wide, and 2¼ feet high ?

9. At 3 cents a pint what must be paid for 6½ quarts of milk ?

10. If potatoes are bought for 50 cents a bushel, what will be the gain on 5 bushels sold at the rate of 20 cents a peck ?

11. How many quart baskets will be required to take to market 3½ pecks of strawberries ?

12. When strawberries are worth 10 cents a quart at wholesale, how many dollars will be made on 1 bushel 1 peck at 15 cents per quart at retail ?

Lesson 11.

1. When sugar is worth 5 cents a pound, how many dozen eggs at 25 cents a dozen will pay for 20 pounds of sugar?

2. When sugar is worth 6¼ cents a pound, how many dozen eggs at 25 cents a dozen will pay for 20 pounds of sugar?

3. How many bushels of potatoes at $¾ a bushel must be given for 10 yards of cloth at $3¾ per yard?

4. James gave away 4 cents, which was ⅙ of all he had; how many cents had he at first?

5. Mary gave 3 oranges to Susan and 5 to Ellen, she then found that she had given away ⅔ of all she had; how many had she left?

6. A boy walking at the rate of 3 miles an hour is 8 miles in advance of a man following at the rate of 5 miles an hour; in how many hours will the man overtake the boy?

7. A lady cut from a piece of calico, containing 40 yards, 12¼ yards for a dress, 7⅔ yards for aprons, 8¾ yards for curtains; how many yards were left?

8. A man bought a horse for $125, and after keeping him 3 weeks at $4½ per week, sold him for $150; how many dollars did he gain?

9. A young man owning ⅔ of a ship, sold ⅙ of his share; if the whole ship was worth $24,000, how many dollars did he receive?

10. How many yards of carpet 1 yard wide will be needed for a room 24 feet long by 18 feet wide?

11. Which is the greater, ½ of 10 or ⅙ of 24?

12. Which is the smaller, ⅔ of 16 or ⅙ of 62?

Lesson 12.

1. Mary does ⅔ of a piece of sewing in a day, while Jane does ⅕ of it ; how much more is accomplished by Mary than by Jane ? In what time will the work be completed if both work together ?

2. A young man spent $60 for a typewriter, which sum was ⅔ of all the money he had ; how many dollars had he after making the purchase ?

3. Said George to Henry, " If you add to my age ¾ of it, and 7 years, the sum will be 35 ; how old am I ? "

4. A school teacher receives a salary of $1500 for 9 months' work, while an engraver receives a salary of $1200 for 12 months' work ; how many more dollars per month of work does the teacher receive than the engraver ?

5. In a school ⅔ of the pupils study Latin, ⅛ study French, and the remainder, 12, study English Grammar ; how many scholars make up the school ?

6. A farmer sold ⅓ of a flock of sheep to the butcher, and ⅓ of the remainder to a neighbor, and still had 50 ; what was the original number ?

7. At a " mark-down " sale a lady bought a hat for $5, but as the hat was out of style she paid $6 to have it made over; had she bought it in the beginning of the season, the hat would have cost $9.50 ; did she gain or lose by the purchase, and how much ?

8. A gentleman bought a bond for $1010 ; a year later he sold the bond for $1080. If he paid $60.06 for the use of the money and received $50 interest on the bond, how much did he gain ?

Lesson 13.

1. A gentleman gave ⅓ of his property to his wife, ½ of the remainder to his daughter, and divided the property left equally among his three sons; what part of the property was received by each son ?

2. A fruit dealer bought 10 boxes of oranges at $3.25 a box and sold the lot for $50; how many dollars did he gain per box?

3. At a certain hour a pole 4½ feet long casts a shadow of 9 feet; what is the length of a chimney casting a shadow of 63 feet at the same time ?

4. A pole has ⅓ of its length in water and the remainder of its length, 14 feet, in the air; how long is the pole ?

5. A pole has ⅓ of its length in mud, ¾ of its length in water, and the remainder of its length, 2 feet, in the air; how many feet long is the pole?

6. What will a boy earn in 9 days, if he receive $3 for working 5 days ?

7. If a boy take 11 steps in walking 16½ feet, how many steps will he take in walking 8 rods ?

8. How many times can a pint measure be filled from a basket of chestnuts containing 3½ pecks? For how much money will the chestnuts retail at 5 cents a pint ?

9. Maud and Belle have together $270 in the Savings Bank, and Belle's deposit is 1¼ times that of Maud; how many dollars has each in the bank ?

10. A second-hand piano cost $60; ⅔ of the price of the piano was equal to 8 times the cost of the piano-stool; how many dollars did the stool cost?

1. Ten are how many times eight?
2. Eleven are how many times eight?
3. Twelve are how many times eight?
4. Thirteen are how many times eight?
5. Fourteen are how many times eight?
6. Fifteen are how many times eight?
7. Sixteen are how many times twelve?
8. Seventeen are how many times twelve?
9. Eighteen are how many times twelve?
10. Nineteen are how many times twelve?
11. Twenty are how many times twelve?
12. Twenty-one are how many times twelve?
13. Twenty-two are how many times twelve?
14. Twenty-three are how many times twelve?
15. Twenty-four are how many times sixteen?
16. Twenty-five are how many times sixteen?
17. Twenty-six are how many times sixteen?
18. Twenty-seven are how many times sixteen?
19. Twenty-eight are how many times sixteen?
20. Twenty-nine are how many times sixteen?
21. Thirty are how many times sixteen?
22. Thirty-one are how many times sixteen?
23. Thirty-two are how many times five?
24. Thirty-three are how many times five?
25. Thirty-four are how many times five?
26. Thirty-five are how many times six?
27. Thirty-six are how many times six?
28. Thirty-seven are how many times six?
29. Thirty-eight are how many times six?
30. Thirty-nine are how many times six?

Lesson 15.

1. Fifty are how many times 7 ? 5 ? 9 ? 4 ? 6 ?
2. Forty-four are how many times 3 ? 4 ? 6 ? 9 ?
3. Sixty-four are how many times 8 ? 6 ? 4 ? 9 ?
4. Seventy-four are how many times 10 ? 8 ? 6 ? 7 ?
5. Forty-six are how many times 5 ? 6 ? 8 ? 4 ? 9 ?
6. Fifty-six are how many times 6 ? 7 ? 5 ? 9 ? 10 ?
7. Sixty-six are how many times 4 ? 9 ? 8 ? 6 ?
8. Seventy-six are how many times 4 ? 5 ? 6 ? 8 ?
9. Fifty-two are how many times 8 ? 6 ? 5 ? 4 ? 3 ?
10. Fifty-two are how many times 6 ? 8 ? 4 ? 5 ? 12 ?
11. Sixty-two are how many times 9 ? 8 ? 3 ? 4 ? 5 ?
12. Seventy-two are how many times 10 ? 8 ? 6 ? 3 ?
13. Forty-eight are how many times 9 ? 8 ? 7 ? 6 ?
14. Fifty-eight are how many times 6 ? 8 ? 9 ? 5 ?
15. Sixty-eight are how many times 5 ? 8 ? 9 ? 12 ?
16. Seventy-eight are how many times 6 ? 9 ? 8 ? 4 ?
17. Eighty-two are how many times 6 ? 8 ? 9 ? 4 ? 3 ?
18. Ninety-two are how many times 8 ? 6 ? 9 ? 5 ?
19. Eighty-four are how many times 8 ? 6 ? 4 ? 5 ?
20. Ninety-four are how many times 6 ? 9 ? 8 ? 4 ?
21. Eighty-six are how many times 6 ? 7 ? 8 ? 4 ?
22. Ninety-six are how many times 4 ? 8 ? 9 ? 3 ?
23. Eighty-eight are how many times 5 ? 6 ? 9 ? 8 ?
24. Ninety-eight are how many times 4 ? 8 ? 3 ? 9 ?
25. Forty-five are how many times 4 ? 6 ? 8 ? 12 ?
26. Fifty-five are how many times 3 ? 4 ? 6 ? 9 ? 8 ?
27. Sixty-five are how many times 6 ? 8 ? 5 ? 4 ? 9 ?
28. Seventy-five are how many times 6 ? 7 ? 8 ? 4 ?
29. Eighty-five are how many times 6 ? 7 ? 9 ? 4 ?
30. Ninety-five are how many times 6 ? 8 ? 9 ? 4 ?

Lesson 16.

1. In 3 and 2 fourths how many fourths ?
2. In 4 and 3 fourths how many fourths ?
3. In 5 and 1 fourth how many fourths ?
4. In 6 and 2 thirds how many thirds ?
5. In 7 and 1 third how many thirds ?
6. In 8 and 2 fifths how many fifths ?
7. In 9 and 3 fifths how many fifths ?
8. In 12 and 1 fifth how many fifths ?
9. In 7 and 3 eighths how many eighths ?
10. In 2 and 5 eighths how many eighths ?
11. In 3 and 2 eighths how many eighths ?
12. In 2 and 6 sixteenths how many sixteenths ?
13. In 5 and 3 sixteenths how many sixteenths ?
14. In 4 and 7 sixteenths how many sixteenths ?
15. In 1 and 9 sixteenths how many sixteenths ?
16. In 3 and 4 sixteenths how many sixteenths ?
17. In 1 and 7 twelfths how many twelfths ?
18. In 3 and 2 twelfths how many twelfths ?
19. In 5 and 7 twelfths how many twelfths ?
20. In 4 and 3 twelfths how many twelfths ?
21. In 6 and 9 twelfths how many twelfths ?
22. In 3 and 7 tenths how many tenths ?
23. In 6 and 8 tenths how many tenths ?
24. In 8 and 4 tenths how many tenths ?
25. In 2 and 5 ninths how many ninths ?
26. In 1 and 7 ninths how many ninths ?
27. In 2 and 7 twenty-fifths how many twenty-fifths ?
28. In 3 and 6 twenty-fifths how many twenty-fifths ?
29. In 4 and 24 twenty-fifths how many twenty-fifths ?
30. In 5 and 9 twenty-fifths how many twenty-fifths ?

Lesson 17.

1. $\frac{4}{7}$ of 28 is $\frac{2}{3}$ of what number?
2. $\frac{3}{4}$ of 16 is $\frac{4}{9}$ of what number?
3. $\frac{5}{6}$ of 36 is $\frac{5}{8}$ of what number?
4. $\frac{7}{12}$ of 48 is $\frac{7}{8}$ of what number?
5. $\frac{5}{12}$ of 36 is $\frac{3}{11}$ of what number?
6. $\frac{3}{14}$ of 56 is $\frac{5}{8}$ of what number?
7. $\frac{4}{15}$ of 30 is $\frac{2}{13}$ of what number?
8. $\frac{5}{32}$ of 64 is $\frac{2}{15}$ of what number?
9. $\frac{7}{9}$ of 27 is $\frac{7}{11}$ of what number?
10. $\frac{7}{13}$ of 26 is $\frac{2}{13}$ of what number?
11. $\frac{9}{10}$ of 30 is $\frac{3}{4}$ of what number?
12. $\frac{5}{6}$ of 42 is $\frac{3}{10}$ of what number?
13. $\frac{5}{6}$ of 54 is $\frac{5}{9}$ of what number?
14. $\frac{7}{8}$ of 32 is $\frac{5}{8}$ of what number?
15. $\frac{4}{5}$ of 75 is $\frac{5}{12}$ of what number?
16. $\frac{5}{7}$ of 56 is $\frac{5}{6}$ of what number?
17. $\frac{7}{9}$ of 72 is $\frac{7}{10}$ of what number?
18. John has 25% more money than William. What per cent of John's money is William's?
19. A man sold a horse for $240 and gained 20% of the cost. What did the horse cost?
20. A man sold a horse for $220 and lost $8\frac{1}{3}$% of the cost. What did he pay for the horse?
21. If 80% of a lot of lumber is sold, what per cent of the lumber is not sold?
22. If there is a loss of $16\frac{2}{3}$% on the cost, when velvet is sold for $10 a yard, what is the cost of the velvet a yard?
23. A man sold a wagon for $50, and lost $37\frac{1}{2}$% of the cost. What was the cost of the wagon?

1. What part of a number is 10% of it?

2. What part of 10% is 1%?

3. What is the meaning of 1% of a number? 2%? 3%? 5%? 6%?

4. What fraction, in its lowest terms, expresses the value of 2%? 4%? 5%? 6%? 8%? 12%?

5. What per cent of a number is $\frac{1}{100}$ of it? $\frac{3}{100}$? $\frac{1}{20}$? $\frac{3}{20}$? $\frac{7}{20}$? $\frac{1}{25}$? $\frac{2}{25}$? $\frac{1}{50}$? $\frac{9}{50}$?

How much is:

6. 1% of 200 houses?	**14.** 12% of 25 days?
7. 2% of 50 sheep?	**15.** 5% of 60 lb.?
8. 3% of 100 men?	**16.** 4% of 250 bu.?
9. 5% of 80 trees?	**17.** 1% of 250 bu.?
10. 4% of 75 books?	**18.** 6% of 300 yd.?
11. 6% of 150 horses?	**19.** 2% of \$350?
12. 8% of 25 boats?	**20.** 30% of 90 men?
13. 7% of \$400?	**21.** 15% of 400 gal.?

22. 3 is 5% of a number. What is the number?

23. Mr. Brown drew 4% of his deposit in a savings bank. If he drew \$10, how much had he in the bank at first?

24. What per cent of a number is $\frac{4}{25}$ of it?

25. How many years in 15% of a score of years?

26. 7% of a regiment of 1000 men were wounded. How many men were wounded?

27. 18 is 9% of what number?

28. If 16% of the inhabitants of a town are voters, and there are 960 voters, how many inhabitants are there in the town?

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Lesson 19.

1. What part of 100 is 12½? 37½? 62½? 87½?

2. How many dollars are there in 12½% of $24? 37½% of $24? 62½% of $24? 87½% of $24?

3. How many ounces are there in 12½% of 1 lb.? in 37½% of 1 lb.?

4. John gave away ⅝ of his marbles. What per cent of his marbles did he give away?

5. If 11 peaches are 12½% of the peaches in a basket, how many peaches are there in the basket?

6. A farmer mowed 37½% of a field containing 24 acres. How many acres did he mow?

7. After selling 12½% of his geese, a farmer had 28 geese left. How many geese had he at first?

8. What per cent of a number is ½ of it? ⅔? ⅘? ⁴⁄₇?

9. What is 14⅞% of $35? 28⅘%? 57⅐%?

10. What is 14⅞% of 10 rd.? 42⅞% of 10 rd.?

11. A bought ⅛ of a field and B ¼ of it. What per cent of the field did each buy?

12. A owns 8⅛% and B 25% of a field. B's share is how many times A's share?

13. What part of 12½ is 6¼? What per cent?

14. What part of an acre is 6¼% of an acre?

15. What per cent of a pound is ₁₆ of a pound?

16. How many square inches are there in 6¼% of a square foot? 11⅛%? 22⅔%?

17. How many square feet are there in 11⅛% of a square yd? 22⅔%?

18. What per cent of a sum of money will each receive, if it is divided equally among 6 men? 8 men? 16 men? 9 men? 7 men? 12 men?

Lesson 20.

How much is:

1. 50% of 36 gal.?
2. 25% of 44 qt.?
3. 20% of 75 A.?
4. 10% of 25 lb.?
5. 10% of $60?
6. 30% of $60?
7. $33\frac{1}{8}$% of 42 rd.?
8. $33\frac{1}{8}$% of 54 sheep?
9. $66\frac{2}{3}$% of 27 ducks?
10. 100% of 35 mi.?
11. $16\frac{2}{3}$% of 48 yd.?
12. $16\frac{2}{3}$% of 7 lb.?
13. $8\frac{1}{3}$% of 24 horses?
14. $8\frac{1}{3}$% of $60?
15. $12\frac{1}{2}$% of 32 qt.?
16. $12\frac{1}{2}$% of 64 cows?
17. $37\frac{1}{2}$% of 40 boys?
18. $87\frac{1}{2}$% of 40 girls?
19. $62\frac{1}{2}$% of 56 children?
20. $6\frac{1}{4}$% of 32 ft.?
21. $18\frac{3}{4}$% of 16 oz.?
22. $11\frac{1}{8}$% of 18 sq. ft.?
23. $22\frac{2}{3}$% of 36 boxes?
24. $14\frac{2}{7}$% of 21 cwt.?
25. $28\frac{4}{7}$% of $35?
26. 5% of 120 geese?
27. 4% of 150 oxen?
28. 2% of 50 cents?
29. 3% of 600 men?
30. 70% of 40?
31. 80% of 30?
32. 90% of 50?
33. 60% of 70?
34. 8% of 450?
35. 6% of 150?
36. 6% of 250?
37. 6% of 300?
38. 6% of 500?
39. 25% of 96?
40. 25% of 800?
41. $12\frac{1}{2}$% of 800?
42. $12\frac{1}{2}$% of 88?
43. $33\frac{1}{3}$% of 63?
44. $16\frac{2}{3}$% of 63?
45. $66\frac{2}{3}$% of 63?
46. $33\frac{1}{3}$% of 270?
47. 50% of $\frac{1}{2}$ lb.?
48. 50% of $\frac{1}{4}$ gal.?
49. 25% of $\frac{1}{2}$ bu.?
50. 25% of $\frac{3}{4}$ mi.?
51. 20% of $\frac{1}{2}$ rd.?
52. 20% of $\frac{1}{8}$ A.?
53. $33\frac{1}{3}$% of $\frac{1}{2}$ ft.?
54. $66\frac{2}{3}$% of $\frac{1}{2}$ mi.?
55. $12\frac{1}{2}$% of $\frac{1}{2}$ lb.?
56. 25% of $\frac{4}{5}$ ft.?
57. 50% of $\frac{6}{8}$ sq. ft.?
58. 20% of $\frac{6}{8}$ t?

1. What per cent of a number is $\frac{1}{4}$ of the number? $\frac{1}{2}$ of the number? the whole number?

2. If 10% of a number is taken away, what per cent is left?

3. A's horse is worth 10% less than B's. If B's horse is worth $200, what is A's worth?

4. If a sleigh cost $60, what will it be worth after its value has decreased 25%?

5. William bought 45 marbles and lost $33\frac{1}{3}$% of them; what part had he left? how many marbles?

6. John picked 12 qt. of berries and James 25% more than John; how many quarts did James pick?

7. What number is 125% of 12?

8. What number is 25% greater than 12?

9. What number is 120% of 25?

10. $\frac{3}{4}$ of a number is what per cent of the number?

11. $\frac{2}{3}$ of a number is what per cent of the number?

12. 150% of a number is what fraction of the number?

13. $112\frac{1}{2}$% of a number is what fraction of the number?

What number is:

14. 20% less than 35?
15. 25% less than 44?
16. $33\frac{1}{3}$% less than 54?
17. $16\frac{2}{3}$% less than 36?
18. $12\frac{1}{2}$% less than 32?
19. 50% less than 400?
20. 50% more than 400?
21. 25% more than 80?

22. $12\frac{1}{2}$% more than 48?
23. $12\frac{1}{2}$% less than 48?
24. 25% more than 60?
25. 10% less than 180?
26. $16\frac{2}{3}$% more than 72?
27. $33\frac{1}{3}$% more than 240?
28. 40% more than 25?
29. $14\frac{2}{7}$% more than 28?

Lesson 22.

1. What part of 90 is 30 ? what per cent?

2. What part of 10 is 6⅔ ? what per cent ?

What per cent of :

3.	80 oz. are 20 oz.?	**11.**	42 is 6 ?
4.	30 lb. are 9 lb.?	**12.**	45 is 5 ?
5.	25 yd. are 5 yd.?	**13.**	30 is 21 ?
6.	60 cows are 20 cows ?	**14.**	24 is 18 ?
7.	60 min. are 10 min.?	**15.**	20 is 30 ?
8.	36 in. are 24 in.?	**16.**	12 is 16 ?
9.	24 eggs are 3 eggs ?	**17.**	28 is 35 ?
10.	144 in. are 108 in.?	**18.**	25 is 30 ?

19. A boy picked 15 qt. of blackberries, and sold 12 qt.; what per cent of his berries did he sell ?

20. 10 oz. of oil are mixed with 5 oz. of turpentine ; what per cent of the mixture is oil ?

21. From a barrel containing 32 gal. of oil 4 gal. leaked out ; what per cent of the oil leaked out ?

22. In a grove containing 60 trees there are 45 pines ; what per cent of the grove are pines ?

23. A has $7½, and B has $30 ; A's money is what per cent of B's ?

24. If 16 lb. of gunpowder contain 3½ lb. of sulphur ; what per cent of the gunpowder is sulphur ?

25. If 8 lb. of lead, 7 lb. of zinc, and 6 lb. of tin are melted together, what per cent of the mixture is tin ? What per cent of the mixture is zinc ?

26. An agent was given bills to collect amounting to $65. He collected $32.50 ; what per cent of the amount of the bills did he collect ?

Lesson 23.

1. 9 is ¾ of what number ? 75% of what number ?

2. $15 is ⅝ of what ? 83⅓% of what?

3. If 20 is 66⅔% of a number, what part of the number is 20 ? What is the number ?

4. If 16 is 80% of a number, what is the number ?

What is the number of which:

5.	13 is 20%?	**11.**	11 is 16⅔%?
6.	100 is 25%?	**12.**	2 is 4%?
7.	22 is 33⅓%?	**13.**	7 is 5%?
8.	22 is 40%?	**14.**	12 is 6%?
9.	21 is 37½%?	**15.**	300 is 30%?
10.	35 is 50%?	**16.**	54 is 90%?

17. 20 is ⅘ of what number ? ⅕ more than what number ? 33⅓% more than what number ?

18. If 30 is 25% more than a number, what per cent of the number is 30 ? What fraction of the number is 30 ? What is the number ?

19. If 24 is 20% less than a number, what per cent of the number is 24 ? What fraction of the number is 24 ? What is the number ?

20. 28 is 30% less than what number ?

21. 22 is 10% more than what number ?

What is the number of which :

22.	24 is 150%?	**27.**	48 is 120%?
23.	27 is 112½%?	**28.**	49 is 175%?
24.	32 is 133⅓%?	**29.**	42 is 116⅔%?
25.	25 is 166⅔%?	**30.**	28 is 140%?
26.	40 is 125%?	**31.**	22 is 137½%?

Lesson 24.

1. What is the interest on $250 for 1 year at 6% ?

2. What is the interest on $300 for 2 months at 6% a year?

3. What is the interest on $50 for 6 months at 4% ?

4. What is the interest on $50 for 4 months at 6% ?

5. What is the interest on $3600 for 30 days at 4% ?

NOTE. In interest problems we reckon 30 days as a month, and 360 days as a year ?

6. What part of a year are 30 days? 60 days? 90 days? 120 days? 150 days? 180 days?

7. What part of a month are 5 days? 3 days? 6 days? 10 days? 15 days? 20 days?

What is the interest on

8. $1000 for 30 days at 6% ?

9. $1000 for 60 days at 4½% ?

10. $500 for 90 days at 4% ?

11. $400 for 1 month and 6 days at 5% ?

12. $1200 for 2 months and 15 days at 5% ?

13. $1200 for 3 months and 10 days at 4% ?

14. $1200 for 4 months and 3 days at 3% ?

15. $600 for 6 months and 20 days at 5% ?

16. $600 for 8 months and 10 days at 6% ?

17. $600 for 1 year and 4 months at 4% ?

18. $500 for 2 years and 3 months at 4% ?

19. $3600 for 3 months and 5 days at 4% ?

20. $3000 for 2 months and 21 days at 4% ?

Lesson 25.

1. The population of a town decreased 20% and was then 720. What was the number of inhabitants before the decrease?

2. A piece of cloth after shrinking 5% was 38 yds. long. How long was it before shrinking?

3. 66⅔% of the contents of a bottle of ether evaporated. It then contained 4 oz. How many ounces were in the bottle at first?

4. A man having paid 87½% of his debts still owed $20. How much did he owe at first?

5. By selling newspapers a boy increased the amount of money that he had 20%. He then had 60 cents. How much did he have at first?

6. A farmer was offered $30 for a cow, which was 75% of his price. How much did he ask for the cow?

7. A coal dealer sold 30% of a cargo of coal and had 280 tons left. How many tons in the cargo?

8. A man bought 40% of a vessel for $2000. What was the value of the vessel at the same rate?

9. 60% of the scholars of a school are girls. If there are 42 girls in the school, how many boys are there in the school?

10. After a 10% reduction in wages a man was paid $9 a week. What was his weekly pay before the reduction?

11. 54 is 12½% more than what number?

12. 49 is 12½% less than what number?

13. 160 is 33⅓% more than what number?

14. 120 is 66⅔% more than what number?

15. 15 is 40% less than what number?

Lesson 26.

1. If cloth costing $5 was sold for $7, how many dollars were gained? What per cent of $5 is $2? What was the per cent of profit?

2. If silk costing $12 was sold for $10, how many dollars were lost? What per cent of $12 is $2? What was the per cent of loss?

NOTE. The *Rate of Profit or Loss* is the *per cent* the profit or loss is of the *Cost Price*.

What is the rate of profit or loss :—

3. If goods costing $100 are sold for $120?

4. If goods costing $140 are sold for $160?

5. If goods costing $250 are sold for $300?

6. If goods costing $120 are sold for $140?

7. If goods costing $180 are sold for $189?

8. If goods costing $120 are sold for $100?

9. If goods costing $30 are sold for $24?

10. If goods costing $42 are sold for $36?

11. If goods costing $35 are sold for $28?

12. If goods costing $50 are sold for $42?

13. A canoe which cost $40 was sold for $36. What was the per cent of loss?

14. If a man buys corn at 45 cents a bushel and sells it at 50 cents, what per cent does he gain?

15. A man bought a 9-pound turkey for $1.50 and sold it for 20 cents a pound. What was the rate of gain?

16. A piece of cloth containing 40 yd. was bought for $3 and sold at the rate of 10 cents a yard. What was the rate of profit?

Lesson 27.

What is the rate of profit or loss:

1. If goods costing $\$\frac{1}{2}$ are sold for $\$\frac{3}{4}$?

2. If goods costing $\$1$ are sold for $\$\frac{3}{4}$?

3. If goods costing $\$\frac{1}{4}$ are sold for $\$1$?

4. If goods costing $\$1$ are sold for $\$\frac{1}{2}$?

5. If goods costing $\$\frac{1}{3}$ are sold for $\$\frac{1}{2}$?

6. If goods costing $\$\frac{1}{3}$ are sold for $\$\frac{1}{4}$?

7. If goods costing $\$\frac{5}{8}$ are sold for $\$\frac{1}{2}$?

8. If goods costing $\$\frac{5}{8}$ are sold for $\$\frac{3}{4}$?

9. If goods costing $\$\frac{1}{2}$ are sold for $\$\frac{2}{3}$?

10. If goods costing $\$\frac{1}{3}$ are sold for $\$\frac{2}{3}$?

11. If a bbl. of flour costing $4 is sold for $4.50 ?

12. If a ton of coal costing $3 is sold for $3.75 ?

13. If a ton of coal costing $5 is sold for $4.50 ?

14. If a cd. of wood costing $5 is sold for $6.25 ?

15. If a cd. of wood costing $3.50 is sold for $3 ?

16. If beef costing 15 cents a lb. is sold for 18 cents a lb. ?

17. If chickens costing 18 cents a lb. are sold for 20 cents a lb.?

18. If a house costing $2000 is sold for $1400 ?

19. If a farm costing $4500 is sold for $6000 ?

20. If a vessel costing $7000 is sold for $6500 ?

21. If a carriage costing $125 is sold for $75 ?

22. If a boat costing $90 is sold for $75 ?

23. If a patent costing $1000 is sold for $2500 ?

24. If a house-lot costing $750 is sold for $1000 ?

25. If a bond costing $800 is sold for $1100 ?

26. If a saw-mill costing $1200 is sold for $2000 ?

27. If a horse costing $375 is sold for $250 ?

1. If goods costing $20 are sold at 10% profit, what is the profit? What is the selling price?

2. If goods costing $12 are sold at 25% loss, what is the loss? What is the selling price?

What is the selling price:

3. When goods costing $60 are sold at 20% profit?

4. When goods costing $80 are sold at 50% profit?

5. When goods costing $120 are sold at 25% loss?

6. When goods costing $50 are sold at 6% loss?

7. When goods costing $200 are sold at 5% loss?

8. When goods costing $48 are sold at $12\frac{1}{2}$% profit?

9. When goods costing $200 are sold at 10% loss?

10. When goods costing $600 are sold at $33\frac{1}{3}$% loss?

11. When goods costing $28 are sold at $14\frac{2}{7}$% profit?

12. When goods costing $42 are sold at $16\frac{2}{3}$% profit?

13. When goods costing $75 are sold at 4% loss?

14. When goods costing $200 are sold at 3% loss?

15. When goods costing $400 are sold at 1% loss?

16. When goods costing $100 are sold at 100% profit?

17. When goods costing $500 are sold at 25% profit?

18. When goods costing $300 are sold at $66\frac{2}{3}$% profit?

19. A piece of cloth containing 20 yd. was bought for 8 cents a yard; what must be charged for the whole piece, if a profit of 25% is to be made?

20. A piece of silk containing 12 yd. was bought for $18. It was sold at a loss of $16\frac{2}{3}$%; what was the selling price per yard?

Lesson 29.

Ex. 1. If goods are sold for $140 at a profit of 16⅔%, what is the cost of the goods?

Since the profit is 16⅔% of the cost, the profit is ⅙ of the cost. Therefore the selling price is ⅞ of the cost. Hence, ⅐ of the cost is ⅐ of $140, or $20 ; and ⅞ of the cost is 6 × $20, or $120. Ans.

What is the cost :

1. When goods are sold for $20 at a profit of 25%?

2. When goods are sold for $14 at a profit of 16⅔% ?

3. When goods are sold for $42 at a loss of 12½%?

4. When goods are sold for $80 at a loss of 33⅓%?

5. When goods are sold for $72 at a loss of 10%?

6. When goods are sold for $25 at a profit of 66⅔% ?

7. When goods are sold for $55 at a profit of 37½% ?

8. When goods are sold for $50 at a profit of 100% ?

9. When goods are sold for $60 at a loss of 20%?

10. When goods are sold for $52 at a profit of 4% ?

11. By selling a horse for $140 a dealer lost 12½% ; what was the cost of the horse?

12. Henry sold a book-case for $15 and lost 16⅔% ; what was the cost of the book-case ?

13. By selling cloth at 18 cents a yard there is a profit of 12½% ; what is the cost per yard ?

14. If 20% is gained by selling sugar at 6 cents a pound, what is the cost of sugar a pound?

15. If there is a loss of 20% by selling butter at 16 cents a pound, what is the cost a pound?

16. If there is a profit of 12½% in selling a pig for $9, what is the cost of the pig?

17. If there is a loss of 10% in selling a pig for $9, what is the cost of the pig?

1. 8 is ½ of what number ? 8 is 20% of what number ? If a profit of $8 is a profit of 20%, what is the cost ? What is the selling price ?

What is the cost and the selling price :

2. When a gain of $20 is a gain of 50% ?

3. When a gain of $5 is a gain of 25% ?

4. When a gain of $7½ is a gain of 25% ?

5. When a gain of $2¼ is a gain of 20% ?

6. When a gain of $13 is a gain of 10% ?

7. When a gain of $30 is a gain of 66⅔% ?

8. When a loss of $70 is a loss of 33⅓% ?

9. When a loss of $90 is a loss of 75% ?

10. When a loss of $12 is a loss of 37½% ?

11. When a gain of $28 is a gain of 40% ?

12. When a loss of $45 is a loss of 90% ?

13. When a loss of $48 is a loss of 80% ?

14. When a gain of $15 is a gain of 16⅔% ?

15. When a gain of $3¼ is a gain of 12½% ?

16. A 4% investment pays $20 a year ; what is the amount invested ?

17. A man receives $60 from a 5% investment and $80 from a 4% investment; how much has he in each investment ?

18. A bankrupt paid his creditors 40% of their claims. Mr. C. received $200 ; what was the amount of his claim ?

19. How much money must be invested in a savings bank, paying 3% yearly, to get a yearly income of $21 ?

Lesson 31.

1. 10 is what part of 50 ? what per cent of 50 ?

2. By an investment of $50 a man gained $10. What per cent did he gain ?

What per cent is received:

3. When an investment costing $60 pays $6 ?

4. When an investment costing $90 pays $9 ?

5. When an investment costing $120 pays $6 ?

6. When an investment costing $80 pays $5 ?

7. When an investment costing $40 pays $2 ?

8. When an investment costing $100 pays $4½ ?

9. When an investment costing $100 pays $3¼ ?

Shares in railroads, banks, etc., usually have a *par value* of $100. By par value is meant the *sum* stated on the certificate of stock for each share. Dividends are paid on the *par value*.

Counting the par value $100, what is the yearly income:

10. From 1 share paying 4% a year ?

11. From 5 shares paying 3% a year ?

12. From 12 shares paying 2½% a year ?

13. From 8 shares paying 5% a year ?

14. From 20 shares paying 7% a year ?

15. If a share of stock paying 5% a year is bought for $50, what per cent of his investment does the buyer receive each year ?

What per cent is received:

16. From an 8% stock bought for $80 a share ?

17. From a 3% stock bought for $50 a share ?

Lesson 32.

1. An agent bought $1000 worth of cotton. What was the amount of his commission at 3% ?

2. An agent sold a house for $8000. What was his commission at 2½% ?

3. How much would a tax collector receive for collecting $20,000, if his commission was 1¼% ?

4. An agent sold a horse for $500. How much would the owner receive, if 4% was charged for commission and expenses?

5. An agent charged $3 for collecting $100. What was his rate of commission ?

6. An agent sold a house for $5000 and after deducting his commission gave the owner $4900. What was his rate of commission ?

7. If money is sent an agent to buy grain and his commission is 2% of the sum paid for grain, what sum must be sent to buy $100 worth of grain ?

8. In the last example, what sum can he invest in grain, if he receives $1.02 ? $5.10 ? $102 ? $306 ? $816 ? $1020 ?

9. A merchant sent his agent $515 to invest in flour at $5 a barrel. If the agent's commission is 3% of the sum paid for flour, how many barrels of flour can he buy ?

10. An agent received $2100 to buy cotton. If the agent's commission is 5% on the sum paid for cotton, what sum can he invest in cotton ? How much is his commission ?

11. An agent sold a house for $5000. How much is his commission at 3½% ?

Lesson 33.

1. If a house is insured for $1000 and the insurance company charges 1% a year for insuring the house, what is the annual charge, or premium ?

2. What is the premium of insurance for $500 on a house at $1\frac{1}{2}\%$?

3. What is the premium of insurance for $2500 on a house at $\frac{1}{2}$ of 1% ?

4. What is the premium of insurance for $3000 on a steam mill at 5% ?

5. A building worth $8000 is insured at $\frac{3}{4}$ of its value for $\frac{1}{2}$ of 1% per annum. What is the annual premium ?

6. A building worth $6000 is insured at $\frac{2}{3}$ of its value for $\frac{5}{8}$ of 1% per annum. What is the annual premium ?

7. The premium of insurance at 1% is $15. What is the amount insured ?

8. The premium of insurance at $1\frac{1}{2}\%$ is $18. What is the amount insured ?

9. What is the annual premium of fire insurance for $2640 at $\frac{1}{3}$ of 1% ?

10. What is the annual premium of fire insurance for $3200 at $\frac{1}{4}$ of 1% ?

11. The premium of insurance at $\frac{1}{2}$ of 1% is $12. What is the amount insured ?

12. The yearly premium for insuring a house for $6000 is $30. What is the yearly rate of insurance?

13. Mr. Brown paid $50 to insure his house for $4000 for 5 years. What was the yearly rate of insurance ?

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Lesson 34.

Discount is a reduction from the amount of a bill of goods, and is usually reckoned at a per cent off. Often *two or more* successive discounts are made from the list prices of goods. In such cases the *first* discount is made from the list price ; the *second* discount is made from the remainder, and so on.

Ex. 1.   What is the net cost of a bill of goods amounting to $500, subject to 20 off ?

Solution :   20% of $500 = $\frac{1}{5}$ of $500 = $100, the discount; and $500 — $100 = $400, net cost.

Ex. 2.   What is the net cost of a bill of goods amounting to $400 and subject to 25 and 10 off ?

Solution : 25% of $400 = $\frac{1}{4}$ of $400 = $100, $400 — $100 = $300; 10% of $300 = $\frac{1}{10}$ of $300 = $30, $300 — $30 = $270, net cost.

What is the net cost of goods billed at :

1. $150 with 10 off ?   **8.** $750 with 20 and 5 off ?
2. $250 with 20 off ?   **9.** $240 with 25 and 10 off ?
3. $440 with 25 off ?   **10.** $320 with 12$\frac{1}{2}$ and 10 off ?
4. $500 with 5 off ?   **11.** $450 with 33$\frac{1}{3}$ and 5 off ?
5. $100 with 2$\frac{1}{2}$ off ?   **12.** $800 with 25 and 10 off ?
6. $600 with 16$\frac{2}{3}$ off ?   **13.** $750 with 20 and 16$\frac{2}{3}$ off ?
7. $900 with 11$\frac{1}{9}$ off ?   **14.** $160 with 37$\frac{1}{2}$ and 20 off ?

15. The net price of a bill of goods, subject to 10 off, was $72.   What was the list price ?

16. The net price of a bill of goods, subject to 25 off, was $180.   What was the list price ?

17. A sold C goods billed at $160 and offered a single discount of 12$\frac{1}{2}$ off, or 10 and 5 off for cash. How much would C gain by accepting the last offer ?

Lesson 35.

1. If a captain sails a small schooner for ⅔ of the " net stock "; what do the owners receive from the proceeds of a voyage that nets $200 ?

NOTE. The " net stock " is obtained by subtracting from the sum received for freight all port and other charges.

2. The captain of a small schooner has ⅝ of the " net stock "; what does he receive from a voyage that nets $78 ?

3. A schooner sailed from Port Liberty to Boston with 229 tons of coal, on which the freight was $1 per ton ; the port charges were $34 and the vessel's bills $5 ; if the captain receives ⅔ of the " net stock," how many dollars do the owners receive ?

4. A schooner sailed from New York to New London with 200 tons of coal, on which the freight was 50 cents per ton; the port charges were $15 and the vessel's bills $3 ; the captain sailed the vessel for ⅔ of the " net stock "; how many dollars did the owners receive ?

5. A schooner carried 250 tons of coal from New York to Dover at $1.10 per ton, the port charges were $50 and the vessel's bills $10; if the captain sails the vessel for ⅔ of the " net stock," how many dollars do the owners receive ?

6. A captain sailed a certain schooner for ⅔ of the " net stock." This schooner carried 300 tons of coal from New York to Exeter at $1 per ton ; if the port charges were $55 and the vessel's bills $8, how many dollars did the owners receive ?

Lesson 36.

1. A cubic foot of water weighs 1000 ounces. If a cubic foot of roll sulphur weighs 2000 ounces, how many times the weight of the water is the weight of the sulphur? How many times the weight of any volume of water will be the weight of a like volume of roll sulphur?

2. A cubic foot of water weighs 1000 ounces, and a cubic foot of basalt weighs 3000 ounces; how many times the weight of the water is the weight of the basalt?

3. A cubic foot of water weighs 1000 ounces, and a cubic foot of clay weighs 1900 ounces; how many times the weight of the water is the weight of the clay?

4. If gold is 19.3 times as heavy as water, and a cubic foot of water weighs 1000 ounces, how many ounces will a cubic foot of gold weigh?

Note.   19.3 means the same as $19\frac{3}{10}$; 1.03 means $1\frac{3}{100}$.

5. Iron is 7.8 times as heavy as water. If a cubic foot of water weighs 1000 ounces, how many ounces will a cubic foot of iron weigh?

6. Silver is 10.5 times as heavy as water. If a cubic foot of water weighs 1000 ounces, how many ounces will two cubic feet of silver weigh?

7. Hard coal is 1.5 times as heavy as water. If a cubic foot of water weighs $62\frac{1}{2}$ pounds, how many pounds will 4 cubic feet of hard coal weigh?

Note.   The *number of times* the weight of any substance contains the weight of an equal volume of water is called the *specific gravity* of the substance.

1. The specific gravity of the diamond is 3.5; how many times the weight of an equal volume of water is the weight of a diamond ?

2. If the specific gravity of lead is 11.3, and a cubic foot of water weighs 1000 ounces, how many ounces will 5 cubic feet of lead weigh ?

3. The specific gravity of mercury is 13.6. A cubic foot of water weighs 1000 ounces.   How many ounces will ½ a cubic foot of mercury weigh ?

4. The specific gravity of tin is 7.3.   A cubic foot of water weighs 1000 ounces. How many ounces will ¼ of a cubic foot of tin weigh ?

5. The specific gravity of crown glass is 2.5, and a cubic foot of water weighs 1000 ounces ; how many ounces will ½ of a cubic foot of crown glass weigh ?

6. A cubic foot of brass weighs 8400 ounces, and a cubic foot of water weighs 1000 ounces; what is the specific gravity of brass ?

7. The specific gravity of brick is 2.1; if a cubic foot of water weighs 1000 ounces, how many ounces will 9 cubic feet of brick weigh ?

8. The specific gravity of chloroform is 1.5.   A vessel contains a mixture of water and chloroform which weighs 2500 ounces.   The volume of the mixture is 2 cubic feet ; what part by volume is chloroform, and what part water ?   What part by weight is chloroform, and what part water ?

9. Which is the heavier, a cubic foot of milk, whose specific gravity is 1.03, or a cubic foot of glycerine, whose specific gravity is 1.27 ?

1. A and B hired a pasture for $48 ; A pastured 5 cows and B 7 cows ; how much should each pay ?

Solution : If A pastured 5 cows and B 7, they both pastured 5 + 7, or 12 cows. If the pasturage of 12 cows cost $48, the pasturage of 1 cow would cost $\frac{1}{12}$ of $48, or $4 ; hence the pasturage of 5 cows, A's number, will cost 5 times $4, or $20 ; and the pasturage of 7 cows, B's number, will cost $28.

2. James and William bought 36 oranges for 18 cents ; James paid 12 cents and William 6 cents ; how many oranges should each receive ?

3. Two farmers hired a pasture for $75 ; one turns in 65 cows and the other 100 sheep; how much should each pay, if a cow eats as much as 10 sheep ?

4. Three men, A, B, and C, bought 120 cords of wood for $300, of which A paid $\frac{1}{2}$, B $\frac{1}{3}$, and C the remainder ; how many cords did each receive ?

5. Three men, A, B, and C, hired a pasture for $150; A puts in 25 oxen, B 26 steers, and C, 120 sheep ; how much should each pay, if 2 steers eat as much as 1 ox, and 5 sheep as much as 1 steer ?

6. A and B agree to do a piece of work for $78 ; A sends 9 men and B 24 boys ; how much should each receive, if 3 men do as much work as 5 boys ?

7. Two partners gain in trade $80 ; A put in $250, and B $150 ; what is each man's share of the gain ?

8. A and B hire a pasture for $38 ; A turns in 6 cows for 3 weeks, and B 10 cows for 2 weeks ; how much should each pay ?

9. Two partners lose in trade $90 ; A put in $500, and B $400 ; what is each man's share of the loss ?

Lesson 39.

1. If A can do a piece of work in 3 days, and B in 5 days, what part of it can they both do in 1 day ? How many days will it take them to do the work ?

Solution : If A can do the work in 3 days, in 1 day he can do $\frac{1}{3}$ of the work ; if B can do the work in 5 days, in 1 day he can do $\frac{1}{5}$ of the work. Hence the part of the work that both A and B can do in 1 day is $\frac{1}{3} + \frac{1}{5}$, or $\frac{8}{15}$; and the number of days required is $\frac{15}{15} \div \frac{8}{15} = 1\frac{7}{8}$ days.

2. A can do a piece of work in 4 days, B in 6 days, and C in 12 days ; how much can they all do in 1 day ?

3. A family uses a barrel of flour in 3 months, another family uses a barrel in 6 months ; how much flour will both families use in 1 month ?

4. A man can do a piece of work in 6 days, and another man can do it in 8 days ; in what time will they do it working together ?

5. A and B can do a piece of work in 3 days, A alone in 5 days ; in how many days can B do the work ?

6. A sportsman and his guide together eat 4 pounds of pork in 3 days. If the sportsman eats 4 pounds in 7 days, how long will the pork last the guide ?

7. A cistern has 2 pipes ; by the first it can be emptied in 10 hours, and by the second in $\frac{1}{2}$ of the time ; how long will both be in emptying it ?

8. A and B can lay a wall in 9 days, A alone in 15 days ; in how many days can B do the work ?

9. An open grate and a range consume 1 ton of coal in $1\frac{1}{2}$ months. If the range consumes 1 ton in 2 months, how much will the grate consume in 2 months ?

1. Three pipes lead from a cistern; by the first it can be emptied in 2 hours, by the second in 3 hours, by the third in 6 hours; what part of the cistern can the 3 pipes together empty in 1 hour?

2. If 3 men can dig a ditch in 4⅔ days, how many days will it take 1 man to dig it?

3. John can cut a cord of wood in ⅔ of a day, and James in ⅘ of a day; in what part of a day can they together cut a cord?

4. If 9 men can do a piece of work in 7⅔ days, how long will it take 1 man to do it?

5. If a man can travel 8⅔ miles in 2 hours, how many miles can he travel in 5 hours?

6. A can do a piece of work in 7 hours, and B in 11 hours; how many hours will it take both to do it?

7. A, B, and C can together make a fence in 9 days; C alone can make the fence in 36 days; in how many days can A and B together make it?

8. A and B can plow a field in 4 days; A alone can plow it in 7 days; if A and B work 2 days, how many days will it take A alone to finish the job?

9. If 5 horses will eat 16¼ loads of hay in a year, what will 8 horses eat in the same time?

10. A man did ⅓ of a piece of work the first day, ¼ on the second, and ⅕ on the third; how long will it take another man to finish the piece of work, if he can do the whole of it in 1 day?

11. A and B can do a piece of work in 7 days; C alone in 20 days; how many days will it take C to finish the work, if A and B work 3½ days?

1. A man receives his board and $2 a day for labor, and pays for board $1 each day he is idle; at the expiration of 40 days he receives $59; how many days was he idle?

Solution: Had he labored 40 days, he would have received 40 times $2, or $80; he therefore lost $80 — $59, or $21, by his idleness. Every day he was idle he lost his wages, $2, and paid for board $1; he, therefore, lost $3 every day he was idle. Hence, to lose $21 it required as many days as there are 3's in 21, or 7. Therefore he was idle 7 days.

2. A laborer receives $1.50 a day and board, and pays for every day he is idle 50 cents for board; how many days was he idle, if at the end of 20 days he received $20?

3. John agreed to pick 25 quarts of berries at 2 cents a qt., and to pay 8 cents for every qt. he sold; he received 20 cents; how many quarts did he sell?

4. A laborer receives $1.75 a day and board, but pays 25 cents for board for every day he is idle; at the end of 12 days he receives $17; how many days does he work?

5. A boy agreed to carry 60 eggs to market for ¼ of a cent apiece, and to pay 1¾ cents for every egg broken; he received 5 cents; how many eggs were broken?

6. Frank agreed to carry 100 peaches to market for ½ a cent each, and to pay 1½ cents for each one he ate; he received 40 cents; how many did he eat?

7. A man receives $2.50 a day for his work, and pays 50 cents a day for board; at the end of 30 days he has saved $48; how many days did he work?

Lesson 42.

1. How far may a person ride in a coach which goes at the rate of 10 miles an hour so that he may be gone 7 hours, provided he walks home at the rate of 4 miles an hour?

Solution : If he goes 10 miles an hour, he will go 1 mile in $\frac{1}{10}$ of an hour; and if he returns 4 miles an hour, he will return 1 mile in $\frac{1}{4}$ of an hour; hence to go and return a mile, it takes $\frac{1}{4} + \frac{1}{10}$, or $\frac{7}{20}$ of an hour. Hence in 7 hours he can go and return as many miles as $\frac{7}{20}$ is contained times in 7, or 20 miles.

2. How many miles may a person ride in a coach going 9 miles an hour, if he is gone 14 hours, and walks back at the rate of 5 miles an hour?

3. How many miles may a person sail in a vessel going 12 miles an hour, if he is gone only 3 hours and returns at the rate of 6 miles an hour?

4. A boat whose rate of sailing is 6 miles an hour moves up a river with a current of 2 miles an hour; how far can the boat go up and return in 3 hours?

5. Suppose that, for every 6 cows a Dutchman has, he should plow 2 acres of land, and allow 1 acre of pasture for every 2 cows; how many cows could be kept on 25 acres?

Solution : If for every 6 cows he plows 2 acres, for 1 cow he plows $\frac{1}{3}$ of an acre; and if for every two cows he pastures 1 acre, for 1 cow he pastures $\frac{1}{2}$ of an acre; hence 1 cow requires $\frac{1}{3} + \frac{1}{2}$, or $\frac{5}{6}$ of an acre, and on 25 acres he could keep as many cows as $\frac{5}{6}$ is contained times in 25, or 30.

6. Suppose that, for every 3 cows a Dutchman has, he should plow 1 acre of land, and allow 1 acre of pasturage for every 5 cows; how many cows could he keep on 24 acres?

Lesson 43.

THERMOMETERS. On the scale of the Fahrenheit thermometer, the temperature of melting ice is marked 32 degrees, and of boiling water, 212 degrees; on the Centigrade thermometer, the temperature of melting ice is marked 0 degrees, and of boiling water, 100 degrees. There are, then, on the Fahrenheit scale, 180 degrees from the temperature of melting ice to the temperature of boiling water; and on the Centigrade scale 100 degrees from the temperature of melting ice to the temperature of boiling water. So 180 degrees Fahrenheit corresponds to 100 degrees Centigrade, or 9 degrees Fahrenheit to 5 degrees Centigrade.

1. A Fahrenheit thermometer indicates a temperature of 68 degrees; what will this temperature be on the Centigrade scale?

Solution: As the temperature of melting ice is indicated on the Fahrenheit scale by 32 degrees, the number of degrees from this temperature to the temperature given would be 68 — 32, or 36 degrees; and this corresponds to $\frac{5}{9}$ of 36, or 20 degrees Centigrade.

2. A Fahrenheit thermometer indicates a temperature of 95 degrees; what will this temperature be on the Centigrade scale?

3. A Fahrenheit thermometer indicates a temperature of 50 degrees; what will this temperature be on the Centigrade scale?

4. A Centigrade thermometer indicates a temperature of 20 degrees; what will this temperature be on the Fahrenheit scale?

Answer: $\frac{9}{5}$ of 20 + 32, or 68 degrees.

5. A Centigrade thermometer indicates 15 degrees; what will this temperature be on the Fahrenheit scale?

Lesson 44.

1. How many cubic feet will 2 cubic feet of air at 0 degrees Centigrade occupy when its temperature is raised 1 degree C.? When raised 2 degrees C.? When raised 10 degrees C. ?

NOTE. A cubic foot of air at 0 degrees, if free to expand when heated, will increase in volume by $\frac{1}{273}$ of a cubic foot on having its temperature raised 1 degree Centigrade; $\frac{2}{273}$ of a cubic foot on having its temperature raised 2 degrees Centigrade. A cubic foot of air at 0 degrees C. will, if free to do so, contract by $\frac{1}{273}$ of a cubic foot when its temperature is lowered 1 degree C.

2. What volume will a quantity of air that measures 2 cubic feet at 0 degrees C. become when cooled 1 degree C.? When cooled 2 degrees C.?

3. To what temperature must 1 cubic foot of air at 0 degrees C. be raised in order that it may occupy a volume of 2 cubic feet?

4. If a cubic foot of air at 0 degrees always contracts by $\frac{1}{273}$ of a cubic foot for every degree its temperature is diminished, how many degrees must the air be cooled that it may occupy no assignable space?

NOTE. The answer to the last question is called the zero of temperature on the absolute scale. So low a temperature as this has not been obtained, and probably long before the air reached this temperature it would be condensed into a liquid.

5. How many cubic feet would a quantity of air, which at 0 degrees C. fills a space of 1 cubic foot, occupy when raised in temperature 100 degrees C.?

6. How many cubic feet would the air mentioned in the last question occupy if it had been cooled to 100 degrees below 0 ?

Lesson 45.

1. I bought pears at the rate of 3 for 5 cents, and sold them at the rate of 4 for 7 cents. What must I charge for oranges bought at the rate of 3 for a dime to make the same rate of profit ?

2. I bought lamps at $1.80 a dozen ; for what must I sell them apiece to gain 20 per cent ?

3. I have put 2 gallons of water into 10 gallons of vinegar for which I paid 15 cents a gallon. If I sell the mixture at 16 cents a gallon, what is my gain per cent of the cost ?

4. What is the cost of 2 bu. 3 pk. 6 qt. of cherries at 80 cents a pk. ? at $2.40 a bu. ? at 8 cents a qt. ?

5. I exchanged a field, 80 rods by 60 rods, for 120 bbl. of flour at $5.00 a barrel. What did I receive per acre for the land ?

6. A and B gained $500. A's stock was $700 and B's $500, and their expenses were $140. What is each man's share of the net gain ?

7. A man agreed to saw a cord of wood for $2.50, cutting each stick into 3 pieces. What should I pay him if I have him cut each stick into 4 pieces ?

8. John writes a letter to his mother four times a week, and uses three half-sheets of paper for each letter ; what will his paper for a term of 20 weeks cost at $6.00 a ream ?

9. In a room, 30 ft. by 20 ft., there are three windows, each 6 ft. high and 5 ft. wide. What per cent of the floor surface is the window surface ?

10. The dividend is 113, the quotient 12, the remainder 5 ; what is the divisor ?

1. On Monday, I sold ⅔ of my pears ; on Tuesday, I sold 16 more than one-half the remainder, and had 20 pears left.   How many had I at first ?

2. The remainder is 1⅔, and the subtrahend 3¾ ; what is the minuend ?

3. A can do a piece of work in 2 days, and B can do it in 3 days.   After A has worked half a day, how long will it take B to finish it?

4. After spending ⅓ of my money, I earned half as much as I had left ; if I then had $13.20, how much did I spend ?

5. I bought a pile of four-foot wood, but on measuring I found the sticks to be only 3 ft. 8 in. long. What per cent should be deducted from the price of the wood ?
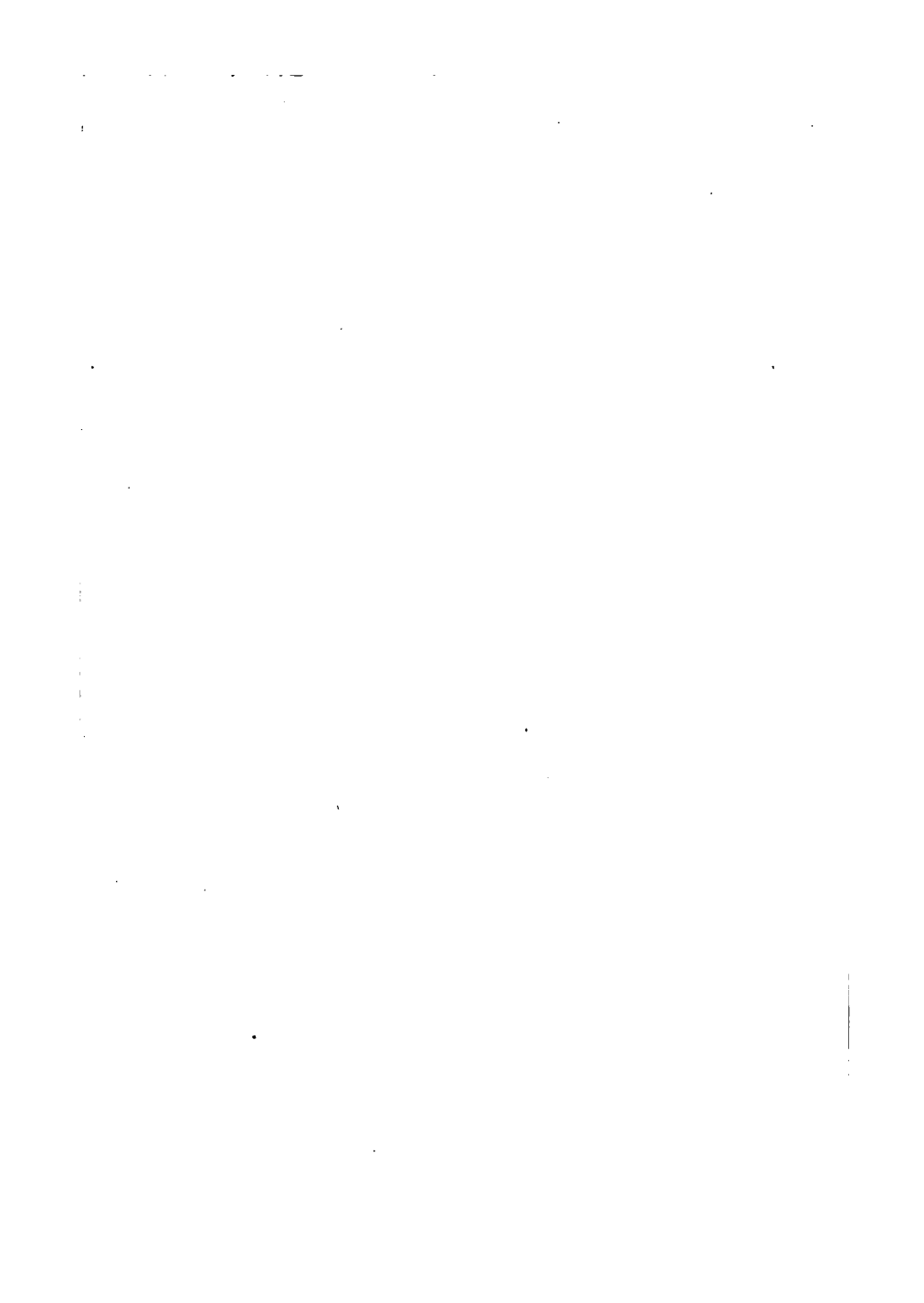
6. If the pile of wood in example 5 was 36 feet long and 4 feet high, and was sold to me at $4.80 a cord, how much did I save by discovering that the sticks were 4 inches short ?
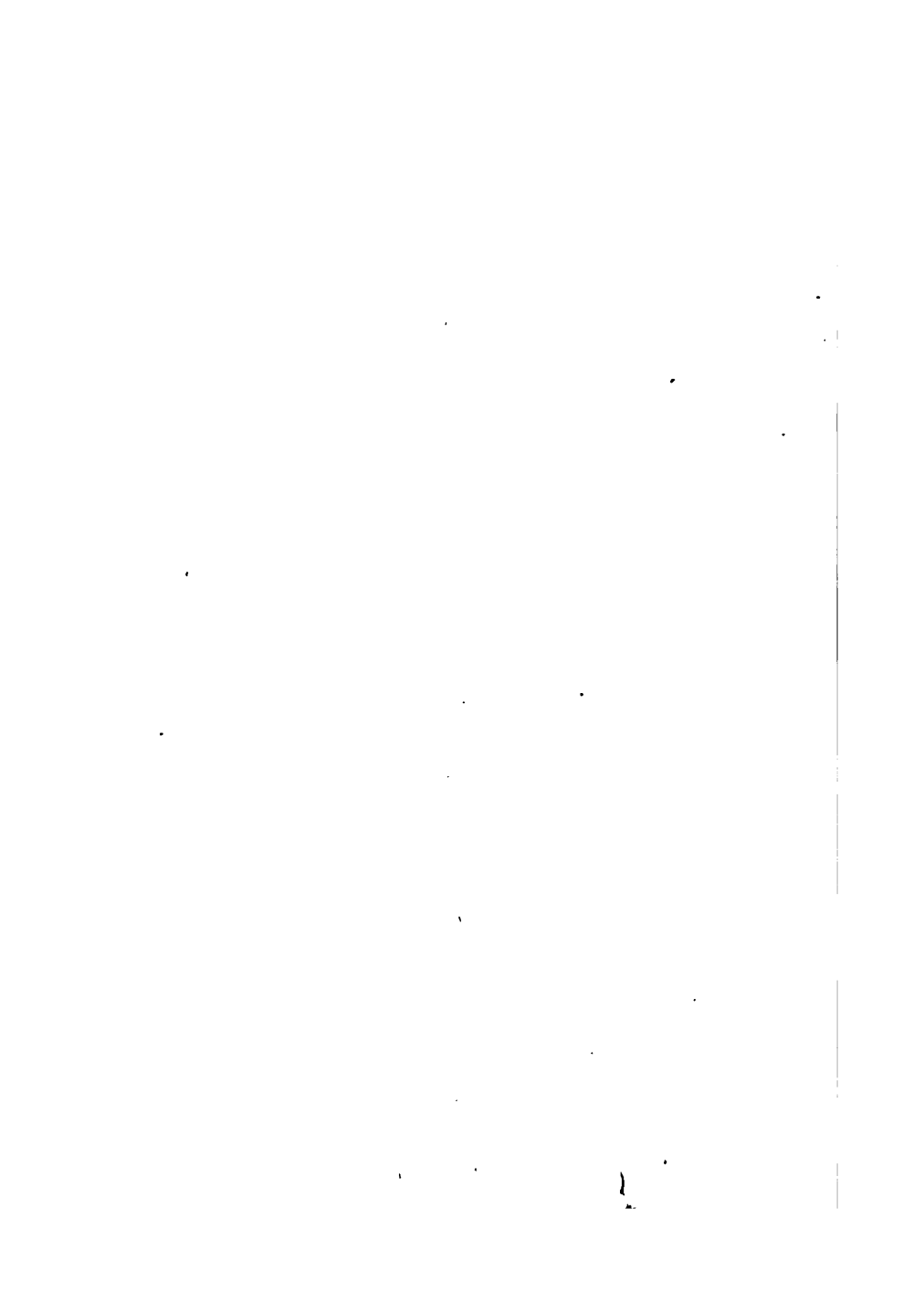
7. How many steps, each 2 ft. 6 in., would be taken in walking along the boundary of a square that measures 10 rods on a side ?

8. The fence to a rectangular lot that is twice as long as it is wide is 120 rods in length.   How many acres does the lot contain ?

9. If I mix 3 pounds of 40-cent tea, one pound at 75 cents and one pound at 80 cents, what must I charge for one pound of the mixture to gain 20% ?

10. A product is 4½, the multiplier is 1⅗ ; what is the multiplicand ?